ELECTRIC

OR

ETHEREAL F

CONSIDERED:

1ſt. NATURALLY, AS THE AGENT OF ANIMAL AND VEGETABLE LIFE:
2d. ASTRONOMICALLY, OR AS THE AGENT OF GRAVITATION AND MOTION:
3d. MEDICALLY, OR ITS ARTIFICIAL USE IN DISEASES.

COMPREHENDING BOTH THE

THEORY AND PRACTICE

OF

MEDICAL ELECTRICITY;

AND DEMONSTRATED TO BE AN INFALLIBLE
CURE OF *FEVER, INFLAMMATION,*
AND MANY OTHER DISEASES:

CONSTITUTING
THE BEST FAMILY PHYSICIAN
EVER EXTANT.

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PREFACE.

Kind Reader,

The moſt of modern Authors are obliged to apologize for attempting the improvement of ſubjects ſo frequently, and very often ſo ſucceſsfully treated of by their predeceſſors: but as the principal part of the ſubſequent pages are occupied on ſubjects entirely new, I have no apology of that deſcription to make. I have only to deſire my reader to look rather at the matter, than at the manner of my treating the various ſubjects which I have taken under conſideration. ethereal fire, or electricity, is a ſubject both novel and occult. Authors who have written on the ſubject, if we may ſuppoſe they ever entered on the margin thereof, have remained at an infinite diſtance from the knowledge of its properties, nature and agency. A few of them, it is true, have diſcovered electricity to be a valuable mean of health; and have recommended it to mankind: But the leading principles, even to the acquirement of its medical powers, have forever paſſed their obſervation.

In the following work I have endeavoured to make ſoundings, to go to the bottom of this intricate ſubject, to unlock the cabinet, and preſent my readers with ſome of the phenomena of nature. My firſt deſign, however, was to inveſtigate medical electricity only; but this latent, myſterious and powerful agent, pervades all creation, is capable of aſſuming ſuch a variety of appearances, and of producing ſuch a variety of effects, both in the animate and inanimate creation, I could not paſs the importance of its agency in creation, in ſilence. I have firſt treated of its natural agency in ſupporting animal and vegetable life—have deſcribed ſome of its different ſtates, and how the health of animals is affected thereby. I have then further conſidered its various properties and effects, its various modifications and ſtates, and have applied them to the celeſtial bodies, and ſhown in the cleareſt manner, that the whole phenomena of gravitation and motion are founded in this ethereal fire —have applied it in particular to the rotations and motions in our own globe, and have demonſtrated, that her diurnal rotation upon her axis, her annual rotation round the ſun, her ecliptic motion in her orbit, the inequality of her diurnal rotation, and the acceleration of her motion when the ſun is in the ſouthern hemiſphere, are altogether performed by the powerful agency of electricity, or ethereal fire. I have ſhown that the polar effuſions preſerve the torid zone from deſtruction by tornadoes. And finally, that all motion in earth, air and water, is to be aſcribed to the exiſting agency of ethereal fire. I have ſhown the probability, if not the certainty, that the ſun of our ſyſtem is an infinite, or an incalculable condenſation of ethereal fire, and being unexpanded, the degrees of his cold are in proportion to the degrees of his denſation; that his inacceſſible luſtre is the conſequence of infinite denſation of electric fire; that all animals and vegetables participate of a degree of the ſame element; and that the preſence of the ſun, or the action of his light, induces different ſtates in that diminiſhed degree of ethereal fire which pervades his whole ſyſtem; and by enduring theſe different ſtates, all his ſyſtem is put into their ſeveral rotations and motions; that the action of his light reduces that elaſticity, or unyielding inflexible property of ethereal fire, or electricity, in certain degrees of its denſity, whereby not only the ſyſtem is put in motion, but the vegetable life is promoted; and that an exceſſive reduction of the elaſticity of elementary fire, is unfavourable to the health of animal life, as the lungs are leſs expanded, and the circulations impeded. I have then demonſtrated the analogy exiſting between the natural and ſpiritual world; that the natural world is framed after the pattern of the ſpiritual; that as the natural ſun governs his whole inanimate ſyſtem by the glory of his preſence, he is a ſtriking emblem of the ſun of the ſpiritual world: and, that as all animals and vegetables participate of the ſame element of the natural ſun, his preſence is the prolific power of all animals and vegetables, their life and animation; ſo alſo is the ſpiritual ſun the quickening, ſuſtaining, animating principle of life to all moral intelligences who participate the nature of the ſpiritual ſun. But as all moral intelligences neither

have, nor deſire to have, nor will believe there is to be had, the ſoul-animating preſence of a ſpiritual ſun, the analogy between the natural and ſpiritual world is broken, and I open the book of nature, if he will believe nothing elſe, to preach to him the doctrine of his depravity.

Having by this time taken an extenſive, but conciſe view of the wonderful agency that Heaven hath aſſigned to the ſingle element of fire, I have ſuggeſted the propriety of improving it artfully, as an excellent antidote of diſeaſes and preſervative of health. I have ſuggeſted, that, conſidering the Author of nature has endowed this element with ſuch a variety of exquiſite powers in the ſtate of nature, it is at leaſt prudent to attempt ſome artificial improvement of it, and not to be tampering altogether with the mere fragments of nature.

But, for myſelf, a probability is ſuperceded by actual experiments continued almoſt twenty years; it is for the ſake of thoſe who have had little or no experience in medical electricity, that I have ſuggeſted probabilities. A certain conviction of its ineſtimable worth, hath impoſed it a duty on my conſcience to publiſh my improvements and diſcoveries to mankind.

This is the part of the ſubject that affords me pleaſure, and that in which mankind are deeply intereſted. The other parts afford ſpeculation to philoſophers and aſtronomers; but this is that in which the lives, healths and intereſts of all ranks, ages and deſcriptions of people are concerned.

It is to be regretted, that electricity hath ever been uſed as a medicine, until its nature and effects were better underſtood. Its uſe hath been greatly perverted, and the firſt expectations of many greatly fruſtrated and diſappointed. Want of a due degree of knowledge to adminiſter it, hath generally rendered abortive every intention of cure by the application. From which hath ariſen the cauſe of electricity having remained in ſuch low repute in the minds of many people. Phyſicians alſo take an undue advantage of this circumſtance, and ſeem determined that it is either not of any uſe, or if it is, that mankind ſhall never know it. They will not give themſelves the trouble of inquiring into the ſubject; but they are very laviſh of ſtigmas and calumnies on thoſe who will do it. Some of them will hear attentively, arguments on the ſubject of medical electricity, which they neither can nor will attempt to refute in preſence of one who underſtands the doctrine, but will loſe no opportunity of prejud: diurnal minds of their neighbours againſt it, eſpecially as fa the ſup. practice extends. They make me think of thoſe who made ſhrines to the goddeſs Diana of Epheſus, and got their living thereby: they cry out, great is the *materia medica!* This electrician is like to do us much damage! Who knows not that all the world (excepting a few inſignificant quacks) have bowed down to the great *materia medica!* Yes, bowed, many millions, quite into the duſt. No matter for that, the ſhrinemakers got a good living by it.

But I have, kind reader, ſtood aloof to all their inſolence, have gone abreaſt to all their oppoſition, and have completed a ſubject, which for its intricacy and importance outvies all undertakings of the kind ever extant. I have unclouded the glory of this ineſtimable medicine, have extricated it from all the abuſes it hath ſuffered from thoſe who have neither known its nature nor its effects; I have preſented it to univerſal obſervation, full-orbed with all its medical powers. I have long ſince deſpaired of the aid of phyſicians to promulgate medical electricity, yea, been convinced that many of them were, to a degree of malice, oppoſed to it. The conſequence hath been, that I have treated the ſubject in a very plain, familiar manner; that any man of common ingenuity may perfectly underſtand the buſineſs—may have a clear knowledge of the effect of the electric ſhocks—of the inſolation or filling the body with fire—in what manner the ſhocks muſt be directed, and repeated, in every particular diſeaſe—what care muſt be taken of the patient; and what corroborating means in many caſes muſt be applied with electricity. I have demonſtrated that the electric ſhocks produce that very ſingular effect which is neceſſary to remove fever and inflammation; that if it is uſed in the firſt ſtages of a fever, there can be no failure of cure; it muſt prove an infallible remedy. I have, in the courſe of the work, conſidered the ſalutary effects of the electric ſhocks, in a great number of diſeaſes—have ſhown that the fluids conduct the electric fire, and in what manner the fluids and ſolids are affected by the ſhock;—that in a prudent uſe of it, every effect produced, in

fluids or ſolids, is ſalutary, and tends to prevent or to remove diſeaſes. I have clearly demonſtrated, that a proper uſe of electric fire is capable of preventing all general diſeaſes in the human body; and that no known general diſeaſe can originate in the human body without a miracle. Theſe aſſertions will, undoubtedly, appear too good to be true, with thoſe who have obſerved many impoſitions offered to the public in this line; but let my reader reflect for a moment, that the medicine I am recommending is infinitely greater than any thing elſe in the natural world; that it is the very ſoul of the univerſe; that it is the accelerating, animating and all-ſuſtaining principle both of the animate and inanimate creation; that the Author of nature hath endowed it with many exquiſite powers, and that, in the artificial improvement of them, it tranſcends all mineral and vegetable productions of medical ſpecifics, as the ſoul of the vegetable kingdom tranſcends the mere fragments thereof. Moreover, ſo far as experience hath gone, no perſon under the uſe of electricity hath ever been arreſted by any fever, pleuriſy, peripneumony or inflammation of the lungs, rheumatiſm or any kind of inflammatory diſeaſe—for it is abſolutely anti-febrile to all intents and purpoſes, and generally anti-ſpaſmodic: it expands every veſſel, more or leſs, according to the ſtrength of the ſhock; it imparts elaſtic ſprings to the veſſels, and accelerates the circulation, and ferments the fluids univerſally; it promotes every deſcription of the ſecretions; it purifies the blood and cleanſes the ſyſtem of humours; conſequently no perſon who uſes the electric ſhocks frequently, and with that degree of prudence which I have taught in the body of the work, ever has, or ever can be troubled with dropſies, ulcers, cancers, quinſeys, king's-evil, St. Anthony's fire, biles, tumefactions, polypus, or extravaſitation of the circulations. Had I known the effects of an electric ſhock on the ſolids and fluids, it would have been eaſy, without an experiment, to determine that it was a remedy of every diſeaſe I have mentioned, or that it was eaſy forever to prevent them. Some will reply, according to this plan, man will live forever. I mean no ſuch thing; but I mean thus much, that there is no doubt but that the greater part of mankind will ſpin out their years to great length, and eſcape much pain, ſickneſs and diſtreſs—will eſcape thoſe rheumatics, ulcers, &c. which deſtroy the nerves and joints, and leave them decrepid for life ; this may certainly be added to the catalogue of bleſſings, with all the aforementioned. If this is not true, how came it to paſs that the celebrated John Weſley, who, when about middle aged, was in a pulmonary conſumption of the lungs, from taking too large quantities of the bark in ſubſtance, as he ſays; notwithſtanding all this and the manner of his life, which was ſedentary, he ſurvived to 98 years. His brother Charles, I believe, is yet living, and muſt be more than 100 years of age. Theſe men made frequent uſe of electricity, and recommend it in the moſt pathetic forms. As for myſelf, I have uſed it very freely, eſpecially in the warm ſeaſons, for nearly twenty years, and I have had no kind of diſeaſe during this time, not even pained for a minute, excepting by ſome trifling wound, and once for a few hours, by neglecting the uſe of phyſic ; my conſtitution is much haler, and I am in much better health than when I began the uſe of it ; for my health was greatly impaired by a bilious habit and frequent attacks of the fever, continual jaundice, and pain in my left ſide, all which are totally eradicated and left me in perfect health ; and this has been effected by the electric ſhocks only, after having ſpent much on ſeveral phyſicians, and in the uſe of other medicine, to little purpoſe.

It muſt be granted, however, that there are ſeveral diſeaſes which, when they are ſeated, and of long continuance, cannot be eradicated by electricity ; but there is ſcarcely one can be named which it will not prevent, if properly uſed for the purpoſe. Hence I have ſuggeſted a method to eſtabliſh a conviction of this important truth in the minds of people generally, as faſt as time and obſervation will admit of it ; which may be done thus :—Let every head of a family, intending to give it a fair experiment for ſeveral years, (for it muſt take ſome time to eſtabliſh ſo weighty a matter) keep an exact account of the diſeaſes that occur in the family, if any there be, and of what deſcription—notice any prevailing diſeaſe that may be about them, in their neighbourhood, city or village—notice its mortal ſway over thoſe who uſe not this preventative mean—obſerve minutely on whom fevers, dropſies and diſeaſes in general prevail ; compare their frequent attacks by diſeaſes, their great expences for medical attendance, loſs of time on beds of languiſhment, to ſay nothing of the excruciating pains, which might make death a welcome meſſenger to them ; after obſerving theſe things a few years, make a fair ſtatement of facts, and publiſh your obſervations to the world. It is worth a little time and trouble to convince people of a truth of ſo much importance to themſelves—the benevolent mind cannot heſitate for a moment, at doing this laudable ſervice for his fellow-creatures—remember, the mercury of man is ſo fixed, that he is bleſſed in bleſſing, or curſed in curſing. We ſupport ourſelves beſt, when we moſt aid, or are moſt ſubſervient to the happineſs of mankind.

> Man, like the generous vine, ſupported, lives ;
> The ſtrength he gains, is from th' embrace he gives.
>
> POPE's ESSAY ON MAN.

As it would be of no importance to any man, to be informed of a valuable medicine which could not be obtained ; I have, in the latter part of the work, deſcribed a very cheap conſtruction of the electrical machinery, which any man may build for himſelf, at two or three dollars coſt and a little labour. This conſtruction, which I have invented, will anſwer a much better medical purpoſe than thoſe imported from Europe, although they coſt ſeveral guineas. I have deſcribed the cheapeſt, that any man may be able to furniſh himſelf with them. They may be rendered ornamental, by thoſe who will be at the coſt thereof.

I have deſcribed the uſe of lightning-rods, and the manner of erecting them upon buildings, the moſt effectually to guard them from damage ; and pointed out the moſt ſecure part of a room, to remain in in time of lightning. Have cautioned people againſt taking ſhelter under trees in a thunder-ſhower, by which means, as well as by taking improper parts of a room to ſit in, many lives are loſt, which might otherwiſe have been preſerved. Finally, I have been careful to communicate every thing in my power, on the ſubject of electricity, that might be uſeful to mankind. I have had a few motives to induce me to treat of electricity aſtronomically, or as being that element in which is founded all the motions and rotations in the heavenly bodies ; and theſe have been, partly to ſpare philoſophers and academicians any further fruitleſs attempts to account for them on principles altogether unconnected with truth : partly to lead us to admire that wonderful harmony, order and deſign which are ſo apparent in creation, and greatly enlarged to our view by the diſcovery ; and refute many objections of Atheiſts to the exiſtence of Infinite Intelligence and Providence ; and partly to ſuggeſt to my reader the reaſonableneſs of endeavouring to improve this wonderful agent in nature, for medical purpoſes.

To be brief, I have, in all reſpects, endeavoured to render this work a rich compenſation to the purchaſer, a laſting bleſſing to mankind. As a teſtimony of my good will to my fellow-creatures, let me urge them to an immediate uſe of the means of health herein recommended—that they turn a deaf ear to the ignorant or deſigning, who will uſe their policy to diſſuade them from any attention to it. Phyſicians, who conſtantly will compare electricity with their ſpecifics, and not being acquainted with any thing that approaches ſo nigh to an univerſal medicine, have got a habit of ridiculing the ſubject of medical electricity, of which they are totally ignorant, merely on account that it claims a notable preference to any other medicine ; and, as it is poſſible that ſome of them are not honeſt, their oppoſition may proceed from a motive juſtly execrable. Be then on your guard, reader ; let them not laugh you out of your money : your money, did I ſay ? it is a trifle ; let them not laugh you out of your lives and healths. In the ſincerity of my ſoul, and for the welfare of mankind, connected with my own ſuſtenance, I have performed theſe labours. Long practice, much obſervation and attention to the ſubject of medical electricity, hath confirmed to me the certainty of what I have advanced, on the power that it hath over diſeaſes ; and I can, without being chargeable with intentional injuſtice, add, the Judge of ſecrets knoweth that I lie not.

We will now introduce an entreaty expreſſed by that truly great ſcholar, chriſtian and philanthropiſt, the Rev. Dr. John Weſley, before named. *Vide* Beauties of Weſley, p. 152 ;

where, writing on medical electricity, he expreſſes himſelf thus : "It were greatly to be wiſhed that the gentlemen of the faculty would ſtrictly examine the nature, properties and effects of this ſovereign remedy, for ſuch it unqueſtionably is, particularly in nervous caſes, even in thoſe caſes which the *materia medica* will in no wiſe reach. But it is not to be expected ; they muſt not diſoblige their good friends, the apothecaries. Neither can it conſiſt with their own intereſt to make (although not every man) ſo many men their own phyſicians, which would be the unavoidable conſequence, if a regular ſyſtem of practical rules was formed from a proceſs of experiments, whereby a ſenſible man might judge in what caſes it would cure, &c. &c."

My reader hath now in his hands a complete inveſtigation of the nature, properties and effects of this ſovereign remedy, together with a conſummate ſyſtem of practical rules, formed from an expenſive, arduous proceſs of experiments, ſo much wiſhed for by this good and great man, who teſtifies in another place, that it far excels all the medicine he ever knew. I muſt now leave you to ponder on theſe things, while I expreſs my wiſhes, that none would be like the fool, who, "having a price put into his hand, hath no heart to improve it."

THE AUTHOR.

ANIMAL AND VEGETABLE ELECTRICITY.

CHAPTER I.

Electricity the principal agent of animal life—of the vegetable life and growth—its action a direct ſtimulus—deficiency of its denſity or elaſticity ſubverſive of animal health, and induces diſeaſes of debility—intenſe and long continued heat reduces its denſity or elaſticity.—Electricity or ethereal fire further conſidered, philoſophically and aſtronomically—all the phenomena of gravitation and motion founded in elementary fire—its qualities and agency bears analogy to the ſpiritual world.

THE electrical effluvia is far more ſubtile than air, is diffuſed through all ſpace, ſurrounds the earth, and pervades every part of it; and ſuch is the extreme fineneſs, velocity and expanſiveneſs of this active principle, that all other matter ſeems to be only the body, and this the ſoul of the univerſe. This element exiſts in all places and in all bodies; and its action is ſufficient not only to be (under the Firſt Cauſe) the ſecondary cauſe of motion, but to produce and ſupport life throughout all nature, as well in animals as vegetables. Now as the heat of every animal is the engine which circulates the blood through the whole body; ſo the ſun, as the heat of the world, circulates or rarifies, condenſes, vibrates, ſtimulates, and by continually changing the ſtate and denſity of this elementary fire, not only gives motion and gravitation to ſurrounding worlds, but doth, on principles occult, impart life, vigour and growth to all animals and vegetables. It is a ſpecies of itſelf, and totally diſtinct from all other bodies.

This elementary fire not only exiſts in animal bodies on an equilibrium with thoſe ſubſtances with which they are conſtantly connected, but the common air, eſpecially when cool, imbibes a large proportion of this elaſtic fire. The lungs inſpire this air, the fire mingled with it is diſperſed through the pulmonary veſſels into the blood; the whole maſs of fluids are, in a degree, fermented and enlivened, and the veſſels being at the ſame time more filled and diſtended, their tone is quickened, and the circulation accelerated; all the animal functions are, in part, put in, and preſerved in motion, and the whole ſyſtem is invigorated by this ſingle agent.

If it is granted, that totally non-conductors become ſuch by their imbibing, in ſome fixed form, a large quantity of this elementary fire, which it is ſuppoſed ſo far conſtitutes theſe bodies, that they are incapable of conveying an

electric ſhock, then it will follow that cold air, which any one may eaſily know is a non-conductor, imbibes, as was before ſuggeſted, an immenſe quantity of this electrical fluid. The conſequence then is, that the lungs ſerve as an electrical machine to all animals, keeping up a conſtant inſolation, by which the ſyſtem is invigorated, as was before deſcribed; this inſolation is ſubject to continual waſte, partly by perſpiration, partly by internal heat which ſubdues its elaſticity, and partly by thoſe leſs electrified bodies with which they are neceſſarily connected.

Theſe operations may be called natural inſolation; but as I am hereafter to deſcribe the effect of the artificial inſolation, the peculiar effects of the natural will be rendered more obvious and certain.

Electric fire promotes the vegetable life, &c.

THAT this effluvia promotes the vegetable life and growth will not be queſtioned by thoſe who are made to believe that it produceth that effect on the animal. The moſt that hath been ſaid of its effects on the animal, will apply to the vegetable, except the action of the lungs, and by their action, a higher life obtains a higher and a greater ſupply, as is neceſſary for its ſupport. But a ſingle experiment will put it beyond all doubt, that what I have ventured to call a natural inſolation, doth exiſt, and produceth the deſcribed effects, and this will appear by adding a little of the artificial thereto, which may be done thus: Prepare, at the proper feafon, a box of earth fufficiently moift, place it on an infolating ftool or ftand, fow in it lettuce feed; at the fame time fow the fame kind of feed in a garden bed; this being done, immediately electrify the box of earth on the ftool, and keep it continually infolated, and it will bring the lettuce to perfection in one half the time of the former. This circumftance alone is fufficient, in my opinion, to put the matter beyond all doubt, that this elementary fire is the principal agent in promoting the growth and life of vegetables.

And it will be fhewn, in its proper place, that the artificial infolation of the human body is as confpicuous an evidence of the fame element being the main caufe of life, motion and vigour in the animal creation.

The action a direct ftimulus.

THAT this elementary fire, electricity, or by whatever name it is diftinguifhed, is a ftimulus, is obvious from all that hath been obferved of its effects on animal and vegetable life. The fluids of animals and vegetables contain more, in proportion to their bulk, of this elementary fire, than the folids of either; and it is the peculiar propenfity of this effluvia, to put in agitation any bodies capable of moving or of being acted upon by this agent. Thus the heart of every animal gives the firft motion to

the blood, this perpetuated by the dilation and contraction of the arteries; at the fame time each particle of the fluids has attached to it a globular atmofphere: this atmofphere buoys up, enlivens and facilitates the flow of blood thro' every part of the fyftem; and being contained chiefly in the fluids, doth, in fome degree, fill and diftend the veffels, and thus excite their action. It is my opinion that could this element be extracted from an animal or vegetable, there would be an inftantaneous decay, which would foon terminate in the death of either.

In fupporting the diminifhed life of the vegetable, a diminifhed action is allotted to this effluvia; its globular atmofpheres always tend to propel, buoy up and diffufe to every the moft extreme part of every flower and branch of the fpreading tree: And it is on this principle only we can account for the juices afcending and diffufing themfelves throughout the vegetable growth.

Deficiency[†] of ethereal fire fubverfive of health.

LIFE and health being fo much fufpended on a full fupply of this quickening principle, it follows that any deficiency thereof muft tend directly to diminiſh life and health either in the animal or vegetable creation : as it reſpects the animal life, the deficiency is in the air, the lungs are not ſufficiently vitrated ; as it reſpects the vegetable, the ſoil is deficient in containing it.

[†] I muft own, that I am ftaggered in determining whether this deficiency, as I call it, doth confift in the reduction of the elafticity of ethereal fire only, or whether, by fome means not yet underftood, elementary fire is abfolutely diffipated and diminifhed in quantity—its elafticity muft be reduced to promote the vegetable growth, for the vegetable life fubfides,

Deficiency of ethereal fire cauſes diſeaſes of debility.

A CONTINUED deficiency of exiſting powers, tend to induce diſeaſes of debility, and inaſmuch as they ariſe from deficiency of ſtimulus, are denominated direct, or diſeaſes of direct debility ; as this reſpects the animal life, the remedy is the artificial inſolation, opium, brandy, and the more durable ſtimulus of diet, &c. As it reſpects the vegetable life, the remedy is water, and ſuch manure as contains a greater quantity of this elementary fire. It was contended before that there is a vaſt diſproportion in the quantity contained in ſolids,

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in the winter ſeaſon. When this element becomes very denſe and elaſtic, their fluids cannot flow in conſequence of this reſiſtance to motion. I am moſt apt to think, that the reduction of elaſticity is a diminution of the exiſting quantity of ethereal fire—but perhaps ſome future experiment may convince me of a miſtake. This element aſſumes ſuch a variety of appearances, and produces effects as various and as unaccountable as the phenomena of its appearances, that perhaps it will be the buſineſs of ages fully to comprehend them all. But one thing I am certain of, and that is, as this elaſticity in air ſubſides, animal life languiſhes ; and that the artificial inſolation directly invigorates the ſyſtem.

(metalic ſubſtances excepted) compared with that which is contained in fluids ; hence there is not only a deficiency of this element in the circumambient air, by reaſon of heat; but through the inability of the ſoil to contain this element, there is alſo a deficiency—dry loam, ſand, &c. contain but a ſcanty portion of this elementary fire.

There is reaſon to believe that the plaſter of Paris is highly impregnated with this fire, for it is a non-conductor, as alſo lime ; but this is ſaid to be imparted by culinary fire, in burning the ſtone ; after the ſame manner it is imparted into the aſhes of wood, which renders them ſo valuable a manure. Some ſuppoſe it is imparted into iron, to render it ſteel ; and is contained in great quantities in a fluid form, as in ſpirits by diſtillation.

Intenſe heat cauſes a deficiency of this quickening effluvia.

NOTWITHSTANDING what hath been ſaid above of imparting elementary fire by the culinary, which is but a different modification of the ſame element ; yet the inſtant theſe bodies, or others ſimilar, undergo this heat, they appear to be diveſted of that which is peculiar to them in their cool ſtate ; glaſs, in particular, when heat to a certain degree, will receive and convey the electric ſhock as freely as braſs or ſteel ; but as ſoon as it is cool again, will make the ſame reſiſtance as before : this reſiſtance is ſuppoſed to be made by the vaſt quantity imparted into the ſubſtance of the glaſs in the furnace; but however that may be, it is certain that whenever it is again rarified by heat, the reſiſtance is loſt, the imparted element ſubſides, and the properties of the glaſs appear to be eſſentially changed. However, as to the truth of this element's being imparted in any form, I am not anxious to maintain it; it is not much to my purpoſe, it is rather the opinion of others: but it is to my preſent purpoſe to ſhew, that the rarification of heat, cauſes a deficiency of this electric effluvia, which is ſo neceſſary to life and health. It being ſo far evident, that ſome bodies contain ſo much of this ethereal element, as their natural quantity, in a cool ſtate, that they reſiſt the approach of an additional quantity, made by art, as glaſs, bees-wax, tallow and ſome other bodies; yet when theſe bodies are rarified by heat, they become diveſted of this natural quantity, or at leaſt of its elaſticity, and will as freely receive an additional quantity as iron or water, which quantity is ſupplied to them by the artificial machinery. If we apply theſe reaſonings to the element of air, which in a cold ſtate is as much a non-conductor as glaſs, bees-wax, &c. and undoubtedly from the ſame cauſe, viz. its own exceſſive natural quantity; it will follow, that heat, in proportion to its degree, diveſts common air of this ethereal element, or of its elaſticity; the conſequence is, that in proportion as the air is diveſted of this eſſential property, the animal life muſt ſuffer in reſpiration; the lungs receive and ſupply leſs of this animating and quickening power, and the animal functions grow more and more languid, and impaired; and if continued long, muſt terminate in diſeaſes of debility. It would be ſuperfluous for me to obſerve, that diſeaſes of debility are peculiarly frequent in hot countries and climates; I mean rather to trace the cauſe to its ſource; and if it ſhould appear to be a deficient ſupply of this ethereal fire, I ſhall lay a foundation for what I ſhall hereafter recommend in diſeaſes of debility as an excellent remedy, viz. the artificial inſolation, with ſome light ſhocks to accompany the inſolation.

Glaſs, by being rarified by heat to a certain degree, loſes its tranſparency and elaſticity; the ſame ſeems to hold true of common air; when the air is thus rarified by heat, with what difficulty do the lungs expand! Fowls that are uſed to ſoaring aloft, and drawing in full draughts of this pure ethereal fire, attached in great quantities to common air, will inſtantly expire if brought into a light rarified ſtate of air by a fire ſide.

It would ſeem, that the elaſticity aſcribed to common air, ſhould rather be aſcribed to this elementary fire attached to it, as alſo its motion: there is reaſon to believe, that, was common air totally diveſted of this ethereal fire, it would remain as inactive as a pond of water, I have obſerved one circumſtance that induces me to think this is the caſe; I have obſerved, that when a thunder-cloud hath paſſed, highly charged with this fiery element, or electrical effluvia, attached to common air, it is diffuſed or blows in every direction from the cloud; even when it hath gone by, it will blow ſtrongly back upon you: the force of the effuſion or blowing, is in proportion to the exiſting degree of heat beneath the cloud, which heat conſtitutes a vacuum; and partly in proportion to the exiſting quantity of electrical effluvia contained in the cloud. It is more than probable, that clouds which diſcharge ſnow in winter, contain equal quantities of this elementary fire with thoſe that emit that element in an expanded form, during the hot ſeaſons; but the element in which they float, viz. common air, is equally impregnated with the ſame element; hence there is no approaching vacuum; and conſequently, no effuſions or emiſſions of electricity expanded, or lightning; no hurricanes, no tornadoes, in any clime where this equilibrium is widely extended: and the extenſion of the equilibrium is determined by the ſame degrees of exiſting cold, throughout any particular clime. As it may be entertaining to the inquiſitive philoſopher, I will endeavour to explain, in my broken manner, the foregoing principles, and demonſtrate that the whole phenomena of gravitation and motion are founded in, and performed by the various

ſtates, effects and operations of this ethereal element, called fire, when expanded. In attempting a theſis ſo occult, intricate and novel, and within ſuch ſcanty limits, my reader will undoubtedly complain of ſome deficiency of demonſtration; but as the reſources of evidence, in reſpect of gravitation and motion, have occupied but a little of my attention, and are, from the imperceptibility of the element in which they are undoubtedly founded, ſo exceedingly remote from obſervation; I hope I may be excuſed in what may appear deficient in point of inveſtigation of the principles.

A baſis of conſiderable part of the ſubject is already executed, and preſented to my hand, in a late publication, entitled, "The Studies of Nature," by a new prince of philoſophers. I mean the immortal DE SAINT PIERRE, whoſe capacious ſoul ſeems to have graſped almoſt the whole viſible creation, explored innumerable laws and harmonies throughout the animal and vegetable world—all ſtampt with divinity—all paying homage to a God infinitely wiſe, who is ſeen in the things that are made. This philoſopher, like the eaſtern ſtar of old, guides, not very wiſe men, but atheiſts and deiſts, and points them to their knees before the infant, infinite Bethlehem God! Henceforth, let no man boaſt of talents, who would darken the light of nature, whoſe reflective rays, under the ken of true philoſophy, apprehend a God ; nay more, a God incarnate ! This truly great philoſopher ſees all creation harmonizing, but man ; him he proves defaced, ſelf-exiled from his God. I know not whether the capacious or moral beauties of his mind outſhine ; his productions have leſſened the dignity of a Newton ; yea, all that name philoſophy, muſt ſtand before him bare, as comets, fronts of atmoſphere, when they approach the effulgent glories of a ſun.

This author has accounted for the currents in the ſeas, in a moſt judicious manner, and upon principles entirely new ; but theſe principles exactly correſpond with my doctrine of gravitation and motion ; and prevent me of a taſk, to which I ſhould have been inadequate. In treating of the diurnal motion of our globe, I ſhall have recourſe to the currents of the ſeas, and ſhall take the ſubject up, where this author has left it. He has not only demonſtrated that theſe currents do exiſt in the oceans ; but alſo, that they proceed from the half-yearly melting of the ices, in the polar regions alternately. In addition to what he hath advanced on the ſubject, I ſhall take the liberty to conſider theſe currents as proceeding upon the true principles of gravitation and motion. It muſt not be underſtood, that I mean any contradiction to what De Saint Pierre has taught on this head, but only to analize the ſubject of gravitation and motion. It is neceſſary to treat of theſe cauſes and their effects in

different terms. I ſhall alſo make a further uſe of theſe currents in preſerving the torrid zone.

In order to make it apparent, that gravitation and motion have their origin in the various ſtates or degrees of denſity of this ethereal electricity, if I may ſo call it, I ſhall endeavour to deſcribe, in a very brief manner, the evidences of theſe different ſtates on which I build my doctrine of gravitation and motion in our globe, and probably in all worlds. I ſhall, in the progreſs of this ſubject, uſe the term ethereal fire, deſignedly ſubſtituted for atmoſphere; and ſhall premiſe, that this element fills infinite ſpace, and is as an ocean, into which the Author of nature has launched all worlds; and that the ſun of each reſpective ſyſtem doth, by its inherent qualities, induce the gravitation and motions peculiar to his own ſyſtem.

This ethereal element, which I think is deſervedly called the ſoul of the univerſe, (for without it, neither animals nor vegetables could live, nor harmony exiſt in all thoſe ſwarms of worlds that float, as it were, in her bowels, and are governed by her laws) aſſumes a variety of ſtates and powers. I call it fire, becauſe, when it expands, it is capable of giving flame to combuſtibles, as lightning will fire a tree, buildings, and many bodies. The ſpark from an electrical machine will give flame to ſpirits; and if the ſpark were ſufficiently copious, it would produce all the effects of lightning. I call it froſt, becauſe, according to the exiſting degree of its denſity, ſo is the degree of cold. I call it inflexible and unyielding, becauſe, according to the degree of exiſting cold, ſo doth this element make reſiſtance to the motion of other bodies, to which it is attached in great quantities. When this element is diffuſed copiouſly, it becomes luminous, as in the aurora-borealis; and tails of comets, it may be, are of the ſame deſcription. I will endeavour to illuſtrate theſe ideas, partly by the artificial electrical machine, and partly from other ſources.

There are ſo many people that have been charged with this ethereal element, from the electrical machinery, who have received no kind of warmth from the inſolation but what aroſe from the quickening of the circulations; but by applying their finger nigh enough to a glaſs of ſpirits to emit the ſpark, the ſpirit would take flame from the fire emitted from the finger, that I need not uſe much argument to prove that this element is the progenitor of flame, although, in its primeval ſtate, it is not poſſeſſed of that quality we call warmth in any degree. Even when this element is diffuſed ſo copiouſly as to appear luminous in time of night, it gives a ſenſation of cold: This may be perceived by holding the hand before a pointed wire which is in contact with the prime conductor of an electrical machine, and the machine charged;

the effuſion will proceed from the extremity of the point, and has all the appearances of the northern lights; but the illumination is viſible only in a dark room.

That the exiſting degree of denſity of this element determines the exiſting degree of cold; or, contrariwiſe, that the exiſting degree of cold determines the exiſting degree of elementary fire, unexpanded, I ſhall produce the following evidences, viz.—It is evident, by charging an electrical machine, that more of this electrical effluvia, or etherial fire, pervades the circumambient air of the machine in cold days of winter, than in warm ſummer days: the machine will not only charge much higher, but the fire is promoted more freely. This circumſtance is a concluſive evidence, that the degrees of cold are determined by the exiſting degrees of denſity of ethereal fire. My reader will pleaſe to excuſe my paradoxical terms, ſeeing it is the ſame element, but in different ſtates or degrees, of which I am treating, that has all the oppoſition of fire and froſt: But I ſhall bring forward more evidence as I proceed.

That this ethereal fire is poſſeſſed of an unyielding, inflexible quality, according to the degree of its denſity, or of cold, I produce the following evidence, viz.—I have invented a very ſimple mean of aſcertaining the quantity of a charge, in a receiver, which I call an electrometer; and it faintly repreſents a ſyſtem of globes, when the machine is charged. It is done thus: I cut into a round ſeven or eight pieces of cork, the ſize of ſmall peas: I make them faſt to the ends of as many fine linen threads, of ſix inches long: theſe are to be made faſt by the other ends of the threads to a large wire, the bigneſs of a pipe-ſtem: one end of this wire is placed in a ſocket in the upper ſide of the conductor, and muſt be about eleven or twelve inches long, and the threads ſeized to the upper end: the top of the wire muſt be covered with bees-wax, to prevent the fire from flying off: the balls will hang about midway of the wire. The demonſtration made by this artificial ſyſtem, if I may venture to call it ſuch, is very ſingular, and not only reflects light on the ſubject of the laſt paragraph, but preſents a phenomenon to view. I will deſcribe it.

If the machine is charged in a warm ſummer day, theſe balls will ſuddenly condenſe round themſelves quantities of the effluvia, by which they may be, in a cool or dry day, repelled to a horizontal plane, and ſometimes higher; but this is by means of the wire on which they are ſuſpended, which alſo contains a quantity, and tends to buoy them up. If you approach them with a lighted candle, they will revolve from the two extremes of the horizontal plane of their atmoſpheres,[*] to the lighted candle, which may be called their perihelions; thence they take a retrograde motion, and revolve round each other, till the threads bring them into cloſe contact. This phenomenon I beheld with admiration; I tried many other bodies, hot iron and cold iron; they produced no ſuch effect: In ſhort, I have never been able to find any body, ſave light, that would produce any ſuch effect. They will attract to any bodies leſs electrified that will convey the ſhock; but if a body higher electrified approaches them, it will repel them, at a given diſtance, that is, as ſoon as their atmoſpheres impinge on each other; juſt as the ſun will repel an inferior atmoſphere of a comet, at a certain diſtance.

The revolutions produced in the artificial ſyſtem, appear calculated rather to explain cometary aſtronomy, than planetary. I can diſcover nothing that looks like rotation upon the axis of a globe. They firſt gravitate towards the candle, or artificial ſun, and will approach, comet-like, within juſt ſuch a diſtance, and are then repelled. If you would force the lighted candle upon them, they will avoid it in every direction; but if you extinguiſh the flame, the whole ſyſtem will fall into contact with it. Hence light is the agent, the nature of which deſerves our attention. There is no flame nor light but what proceeds primarily from electric fire; this is the mother of fire and of light. I have ſuppoſed the ſun to be an infinite denſation of ethereal fire, which conſtitutes his brilliancy. We may ſuppoſe, from one circumſtance, that the burning of tallow in a candle, forms a light, the nature of which is the nigheſt to that of a ſun, excepting ſuch other bodies as bear a correſpondency to tallow. The ſame quantity of blaze, made by fuel, doth not contain half ſo much light as that of the tallow candle. The reaſon I ſhall aſſign for it, is this: tallow is one of thoſe bodies which inherits ſo great a natural quantity, that it will not receive any artificial quantity, in conſequence thereof, and being thus united by ſome inexplicable law in the ſubſtance of the tallow, is with it emitted, or as it were oozed into flame: this operation is a medium between the effuſion and expanſion of ethereal fire. I will name it *flamumfuſion*, that is, fuſion with or in flame. This flamumfuſion, or ethereal fire in flame, in or with the tallow, produces forcible rays of light, and very aptly mimics the action of the ſun's light upon her ſyſtem. It will appear that I am certainly right, when we conſider that what I have ventured to call flamumfuſion of electric fire, produces the ſame repulſive effect upon my artificial ſyſtem, that the greater electrified ball produces upon the leſſer—hence there muſt be electric fire (give it what name you will) contained in the blaze of the candle. But this artificial ſyſtem reſiſts motion in ſevere cold,

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[*] It will be obſerved that I have uſed the term atmoſphere, but it is for diſtinction ſake. Atmoſphere impinges on atmoſphere, and makes one undivided whole; atmoſphere governs not, unleſs it impinges on another; this element will not repel its own particles, unleſs in near contact—nor will the ſun repel a comet, but at a certain diſtance, notwithſtanding its infinite denſity of the ſame element.

or according to the degrees of the natural denſity of ethereal fire—the warmer the weather, the quicker is their motion. This my reader will pleaſe to bear in mind, until we ſhall account for the quickening of the earth's motion, when the ſun is in the ſouthern hemiſphere, and her nigher approach to the ſun, as well as the inequality of her rotation upon her axis.

But I have a further uſe to make of my artificial ſyſtems; for they do not only reſiſt motion from the approach of light, in proportion to the exiſting degree of denſity of this ethereal fire, or cold; but they reſiſt motion from other cauſes; thus, in charging the machine, in ſevere cold, they are very obſtinate in repulſion, and the operation muſt wait ſome time to diſcover the diameters of their atmoſpheres, which is determined by the diſtances of the globes (which by the way diſcovers the quantity of the charge in any particular receiver.) In arriving to their utmoſt diſtances, they are evidently reſiſted by an unyielding quality or property, peculiar to an encreaſed natural denſity of this ethereal element. Again, when the machine is diſcharged, there is the ſame reſiſtance in their coming into contact with each other; but in warm days of ſummer, they are immediately repelled; and on diſcharging the machine, they are inſtantly in contact again.—But if it ſhould be aſked whether this reſiſtance is made by the denſity of the ſurrounding effluvia attached to common air, or whether it in any degree ariſes from the inflexibility of the effluvia, that forms the pluſs electrification in the receiver and throughout the machine; I anſwer, in extracting the ſpark from the machine, there is evidently a reſiſtance; the artificial quantity inherits the quality of the natural. The pluſs electrification is not voided, and the equilibrium reſtored with a ſingle touch in a cold day in winter, as in a warm ſummer day. This confirms one point, viz. that the reſiſtance is abſolutely founded in elementary fire, according to the degrees of its denſity, and that the exiſting degrees of cold are the criterion by which it may be known. Furthermore, it is ſomething probable that the natural, if not the artificial denſity of ethereal fire, may be promoted to ſuch incalculable degrees, as to render all means of expanſion utterly impoſſible; and it is not improbable that the great Author of nature has conſtituted the luminary of day upon theſe very principles: it is very evident that the ſun of our ſyſtem poſſeſſes the qualities of electrical fire; it certainly repels the atmoſphere of a comet, as one pluſs electrified ball in an electrical machine will repel the atmoſphere of another, and the leſſer atmoſphere gives place to the greater. The amazing brilliancy of the ſun, may alſo ariſe from its infinite denſity; what has been ſaid of the tranſparency of glaſs, may reflect ſome light on the ſubject: Electricity becomes luminous by copious effuſions, as before obſerved, but unexpanded.

The air is more brilliant in ſevere cold, or according to the degree of the exiſting denſity of the electrical element attached to it.—The liquid element, as water, becomes more luminous when congealed to ice by the intenſeneſs of the extreme denſity of the ſame effluvia. But it is peculiarly neceſſary that I ſupport my laſt propoſition, that is, that water is congealed by this elementary fire unexpanded; I prove it thus: there are ſeveral bodies, that from their own inherent natural quantity, as glaſs, bees-wax, tallow, &c. reſiſt the approach of an artificial quantity, as hath been before obſerved, until by warmth that natural quantity is diminiſhed; the ſame holds true of ice, and of ſnow, in a degree; an icicle, in ſevere cold, reſiſts the ſpark from the prime conductor of an electrical machine, or is at beſt but an imperfect conductor; whereas, let it be reſolved to water, which muſt be done by warmth, and the reſiſtance to motion is entirely loſt, both in reſpect of its own particles, and that of the electric ſpark. Hence it is evident, that its brilliancy ariſes from the exceſſive quantity of the ethereal effluvia impregnated into this liquid element, which alſo congeals it to ice. From all theſe circumſtances, it appears that an encreaſed denſity of the electrical effluvia, is an encreaſed degree of brilliancy, and in the hands of its divine Author, may be encreaſed, *ad infinitum;* and conſequently we have every reaſon to believe that this element, which I call the ſoul of the univerſe, is wrought by the finger of God into ſuch an encreaſed degree of denſity, as conſtitutes the unapproachable luſtre of the ſun.

Here let us pauſe a moment, and behold the wiſdom of the great Architect. This ethereal fire which pervades all creation, in a degree, is the ſource of life and growth to the whole family of animals and vegetables; and, as we ſhall by and by perceive, produces all the phenomena of motion, in earth, air and ſeas—ſee its utmoſt glories conſummated in the ſun; behold him as the envoy of heaven, ſitting regent, as on a throne of ſtate, and by tacit thunders of his laws, bids his ſyſtem roll in orders intricate and multiform—looks on the frigid zones, bids their ices yield to liquid form, and flow profuſe from pole to pole; nor lets the limpid ocean ſicken beneath the luſtre of his face, nor air, nor ſeas in frantic forms appear. But theſe notes are a little premature; it is time to recapitulate thoſe principles which have been laid down as a leading clue to the inveſtigation of the doctrine of gravitation and motion, and on which I ſhall endeavour to make it appear they are founded.

I think it is experimentally demonſtrated, that this ethereal fire is as extenſive as earth, air or water—that it pervades infinite ſpace; that, however certain immenſe bodies of it may be attached to particular globes, yet this body effects no government, but by being in near contact with other bodies of the ſame element;

which is nearly tantamount to what was ſaid before; it is as an ocean, in which floats infinite creation. It is furthermore demonſtrated, that this ethereal fire* aſſumes very different appearances, and oppoſite ſtates and effects, according to the degrees of its denſity; that in an encreaſed degree of its denſity, motion is reſiſted, both in reſpect of its own body, and of thoſe other bodies in which it exiſts—that the congealing of water to ice, is a ſpecimen of its denſity and inflexibility—that notwithſtanding water is as apt a conductor almoſt as ſteel or iron; yet when it is congealed to ice, or imbibes an encreaſed degree of this inflexible effluvia, it will reſiſt the electric ſpark; this is undoubtedly cauſed by the encreaſed degree of its own natural quantity of fire; and it is furthermore evident, that an exceſſive natural degree of electric effluvia, will make reſiſtance, even to the expanſion itſelf of the artificial degree.

It is alſo demonſtrated, that warmth, in proportion to its degree, deſtroys the elaſticity or unyielding inflexible qualities of this ethereal fire; and that by producing this effect, motion proceeds, both in reſpect of the elementary fire, and of thoſe other bodies with which it is in contact, whether it be earth, air or water; and that this warmth is produced by the action of the ſun's light, no one will pretend to diſpute; it is become too familiar to our ſenſes to need any argumentation to illuſtrate it. We have noticed and demonſtrated, by actual experiment, that light will produce an effect upon an artificial ſyſtem of globes, which no other body can be found to produce; that the light of a candle will produce motions, which may be demonſtrated perihelions and aphelions, and ſome other motions which cannot be at preſent fairly explained and applied to the ſyſtems of nature, becauſe the globules are conſtrained by the threads on which they are ſuſpended. We have made it apparent, that this electric effluvia is not poſſeſſed of the quality of warmth naturally, or in the ſtate of nature, but that warmth is an effect of its action, or expanſion —it produces warmth in animals by accelerating the circulations—it is literally fire when it expands, and takes the name of culinary when i acts upon fuels. We have obſerved, that it becomes luminous by effuſion, inſtanced in it evaporation from the point of a metalic rod and in the aurora-borealis, and in the tails of comets—that it becomes luminous by condenſation, inſtanced in glaſs, ice and air; and that inaſmuch as denſity reſiſts expanſion,* we hav

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* Although it is hard for us to conceive of fire without burning; yet as there is no fire but by the expanſion of this element in ſome form or other, I have ventured to uſe the term fire. It certainly appears to be the mother of fire and of ſuns.

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* Were not this the caſe, that natural denſity reſiſted expanſion, the ſun might expand, or emit globes of ſparks upon his ſyſtem; and by deſtroying them, would be himſelf deſtroyed.

every reaſon to conclude, that the ſun of our ſyſtem conſiſts of an incalculable condenſation of electrical fire. We noticed the ſimilarity of effect produced by the ſun upon a comet and that of two electrified balls, in an electrical machine; and that the greater body of fire governs the leſſer.

Having briefly ſtated the powerful agency of this hidden effluvia, and conſidered her various forms, ſtates and effects; let us now apply her laws, and ſee to what they will amount in conſtituting gravitation and motion, in our globe.

Firſt, Theſe principles will account for the currents and fluxes in the ſeas or oceans. Theſe currents are minutely deſcribed by that ingenious philoſopher De Saint Pierre. This great man, however, having never entered into this ærial ſyſtem, aſcribes this effuſion from the poles to the thawing of the ices ſimply: I doubt not but the thawing of the ices is neceſſary to promote theſe currents; but it is evident, from the foregoing arguments, that air muſt have the ſame anti-elaſtic effect produced on it, in order to produce a general fuſion from either of the poles towards the equator; and indeed, for certain purpoſes, to be hereafter deſcribed, the Author of Nature has appointed them a much longer tour.

We will now ſuppoſe the ſun to be paſſing into the northern hemiſphere; the conſequence then is, that the action of her light upon the circumambient air and waters, which have, during our winter, been retarded in their motion, in part congealed to ice, and totally ſuppreſſed, is again put in motion; the inflexibility of this pervading effluvia is taken off by warmth; the ices aſſume a liquid form; the ſame reſiſtance to motion, in the air, is removed, and both elements pour profuſely from the polar regions; and this reſiſtance is diminiſhed more and more, until it reaches the zenith of the ſun; this point admits of the higheſt ſtate of rarifaction, and, conſequently, forms the moſt complete vacuum, or place of non-reſiſtance; and to this vacuum, or ſpace of leaſt reſiſtance, the waters gravitate, as well as the air, freely. But, notwithſtanding, the zenith of the ſun is the central point of gravitation to the waters; yet from the amazing velocity of the motion of the waters from the northern regions, they are not ſtayed, even in the centre of gravitation; their impetuoſity hurries them on a great diſtance towards the ſouth pole; and, as De Saint Pierre has very plainly ſhewn, the Atlantic current doubles the Cape of Good Hope, and forms a current along the coaſts of India: the currents continue till the autumnal equinox. The exceſſive effuſions from the north pole, during our ſummer, is partly occaſioned by enormous quantities of water, accumulated in the polar regions during our winter, and retained, on the principles of condenſation, before explained, in the ocean, bays, lakes, &c. as well as in the air; the exhalations from the waters, in warmer regions, are carried by ſoutherly currents of air, into colder regions, where they become condenſed, and remain until this denſity is removed by the warmth of the ſun. Theſe enormous accumulations, when the reſiſtance to motion is taken off, pour in torrents towards the latitude which the ſun then occupies; which is the centre of gravitation to this effuſion: but as this accumulation is an overbalancing proportion of the liquid element, it exceeds the bounds of natural gravitation; and its currents are experienced in all the ſouthern regions, nearly to the ſouth pole.* The currents that proceed from the fuſion of the ſouth pole, during our winter, likewiſe, force their currents nearly to the north pole, where their waters become condenſed, and accumulated in great abundance. Theſe half-yearly accumulations, and half-yearly fuſions, are of the moſt eſſential utility; and, indeed, without them, the oceans would become uninhabitable, or impaſſable to mariners. The elements within the tropics would undergo ſuch alternate rarifactions, as would induce tornadoes, that would ſweep the face of creation, and ſpread devaſtations throughout the tropical regions, at leaſt. This we may be aſſured of, by reflecting for a moment on that wild diſorder of the elements, which takes place when the ſun arrives at the equinox, at which time the currents are ſtayed, and the waters, as well as the air, remain in the ſame latitude; the intenſeneſs of heat, generated by means of the ſun's light acting upon the ſame portion of theſe elements, produces effects much to be dreaded; tempeſtuous winds, from time to time, raiſe the briny billows almoſt to the clouds, and plunge navies in her bowels, or ſweep the neighbouring ſtrand, and lay whole cities proſtrate in ruins. Some of the ancients ſuppoſed the torrid zone to be uninhabitable; this muſt have been the caſe, had not the all-wiſe Author of Nature, whoſe ſuperintendance appears more and more conſpicuous as we underſtand nature, ordained theſe alternate currents, both in the liquid and airy element. Theſe currents, as I before obſerved, not only diffuſe a more general warmth over the face of the whole globe; but they likewiſe prevent that devaſtation, which otherwiſe would depopulate the moſt charming part of the earth.

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* I cannot, here, undertake to tranſcribe De Saint Pierre's detail of the general currents, counter currents and monſoons, from the half-yearly fuſions of the poles: his writings, from their ſingular merit, it is hoped, will ſoon be in the hands of the moſt of people, who have any taſte for uſeful information—for that knowledge, which muſt make an atheiſt bluſh for his ignorance; and they, indirectly, confront the deiſt with equal force. This author proves that deſign which implies infinite intelligence, throughout all nature.

Here then we ſee, that motions in air and water are encreaſed, in proportion as the inflexibility of the ethereal fire is diminiſhed; and this is diminiſhed in an exact proportion

to the exiſting degrees of warmth. Moreover, this latent heat is promoted, more or leſs, in proportion to the qualities of that body on which light is reflected, and according to the ſmoothneſs of its ſurface and flatneſs of its oppoſition to that body of light, acting upon it. This may be perceived, by holding a flat piece of metal nigh a fire-light, as pewter, or tin; and if you oppoſe your face or hand to the pewter or tin, while the light of the fire plays upon its ſurface, it will reflect a ſenſible degree of warmth upon your face:[*] the metal muſt be held obliquely to the fire (which, however, leſſens the action of light) in order that you may approach it, without intercepting the light from the metallic ſubſtance.

But there are other bodies that reflect no ſuch warmth. This is the refractive or reverberatory power of light, and not culinary heat, if I may uſe the term; for the metal will remain cold, and may be held ſo far from the fire, in a winter evening, that water ſhall freeze at a leſſer diſtance. From theſe things we may learn, that the liquid element reflects the rays of the ſun, more ſtrongly than the earth; that theſe refractive operations are ſtill

[*] From this production of warmth, is it not probable that a dwelling-room might be rendered ſufficiently warm, for the winter, by ſheathing, or lining the room with tin, and keeping up the bright light of a lamp in its centre? but perhaps it would be neceſſary to exclude the light of the ſun by windows, as contrary illuminations might prevent the regular action of either.

greater when the waters are calm and ſmooth: hence the alternation ſo often from calm to tempeſt; and from tempeſt, which diminiſhes the rarifaction, to calm. Let the ſun be a world of culinary fire, if you will; nothing but its light, produce any effect on this globe —its rays penetrate through millions of miles of eternal cold, and produces rarifactions, various as thoſe bodies on which they are reflected. The ſandy, deſert plains of Africa, are more reverberatory than any other part of the earth, and the greateſt rarifactions are produced there. It is from theſe different degrees of rarifactions, that the currents of air are produced: thus it is that the currents of air are in ſo much conformity to the currents of water. The monſoons in India, as well as in ſome other places, are in conformity to the currents of water, (their counter-currents excepted;) but the currents of air change fifteen or twenty days ſooner than the currents of water; the elaſticity of air, or its inflexibility, is reduced, and commences motion ſo much ſooner than the icy condenſations of the polar regions. The diminiſhed ſtates of rarifaction on the land, compared with that over the water, (ſand plains excepted) ſets bounds to the currents of air, in the ſame manner as the land ſets bounds to the currents of the waters; though not with the ſame degree of minuteneſs. Clouds, alſo, intervening in particular parts of the hemiſphere, may, and do, all over

the globe, change the ſtates of rarifaction, and of courſe, determine various ſhifts of wind. It will be endleſs to trace all theſe viciſſitudes of currents, and obſerve their immediate cauſes; enough hath been advanced to explain the principles of the doctrine of motion, as it reſpects air and water; and it is undoubtedly poſſible, by theſe principles, to account for every different current of air, by land or ſea. But there is a current of air, called the Trade Wind, which blows acroſs the Atlantic Ocean, nearly from eaſt to weſt, along the equator, until it is intercepted by the mountains and lands of South America, where the rarifactions are diminiſhed, and the current ceaſes. This apparent current of air is induced by the velocity of the earth's motion at the equator; being of greater diameter there, than in any other part, conſequently her motion is proportionably quicker; add to this alſo, that the elaſticity or inflexibility of this latent fire, which, as I have before argued, gives all the power of motion to common air, is reduced, more or leſs, continually, at the equator: and it will appear, that this current is only apparently ſuch; juſt as a man, riding full ſpeed on horſeback, will experience a ſenſation of being met by a current of air; which, however, in a calm day, will ſubſide as ſoon as he comes to a halt.

But it may be aſked, why is not this current uniform in all parts of the equator, round the globe? To which I anſwer, there is not the ſame continued degree of rarifaction from eaſt to weſt, in any other part of the equator, as from the Indian Ocean, acroſs the burning ſands of Africa, and thence acroſs the Atlantic Ocean, until you reach the mountains of South America. It appears to require a lengthy tract of rarifaction to conſtitute this apparent current of air. Other circumſtances may likewiſe occur, to intercept this paſſive ſtate of air. The equator is continued a great diſtance on the Weſtern Ocean; but obſerve, theſe waters continue quite to the ſouth pole, and almoſt to the north; and the rarifactions become more extenſive and various. But the rarifaction which gives riſe to the Atlantic current of air, called the Trade Winds, has its focus in the ſandy plains of Africa, where the rarifaction is undoubtedly higher than in any part of the liquid element. And, although this current of air is not perceptible until you come ſome diſtance into the Atlantic Ocean, yet that will not prove that it has not its focus in theſe burning ſands, where the heat is ſo very intenſe, as to fire ſome combuſtibles. And it is likely it is rendered perceptible, finally, by imbibing the exhalations from the Atlantic, as it glides under it. Furthermore, the variation of ſoil, north and ſouth of theſe oceans of ſand limits the extent of the rarifaction, and determines it to be near the equator. Hence, the ſurface of the earth, at the equator, rolling

with a velocity more than one thouſand miles in an hour, glides under this detached portion of air, till it is met by the mountains of South America, or its circumambient regions of denſer air. Theſe appearances ſubſide at the time of the vertical equinoxes; the currents in the waters then ſubſide, and the rarifactions in the Atlantic become more intenſe and extenſive, which cauſe various ſhiftings in the currents of air, and terrible hurricanes; and, as I before obſerved, would lay waſte the torrid zone, had not the all-wiſe Author of nature ordained theſe polar effuſions, which cauſe ſucceſſively new portions of air and water, except at the equinoxes, to receive the vertical flame of the ſun; which alſo keep up a more equal degree of warmth throughout the globe.

Theſe new principles of gravitation and motion will, if I miſtake not, account for the diurnal rotation of our globe upon its axis. In treating of the polar effuſions, we conſidered the centre of their gravitation to be the vertical of the ſun's zenith; but from the overbearing of the torrents, from either of the poles, when in fuſion, they break through all reſtraints, and, to ſerve a wiſe purpoſe, ſpread from one frigid zone to the other. But I ſhall contend, notwithſtanding, that the vertical point of the ſun, in any part of the different oceans, is a central point of gravitation to the waters; that this vertical flame of the ſun, forms the moſt conſummate non-reſiſting vacuum; that the waters, in eternal ſucceſſion, gravitate from the two extremes of the polar regions, in a degree; and, indeed, from an extenſive circle, to a vertical point with the ſun: and that the gravitation of the waters to this non-reſiſting vacuum, gains a preponderating heft to the oppoſite part of the globe; and by this overbalancing weight, the motion of the globe is perpetuated on her axis. That the waters riſe in this highly rarified vacuum, is certain;—the volatile particles will even aſcend from the ſurface, as high as the rarifaction is reflected, into the hemiſphere. But what will render it ſtill more certain, the evening tides, in the ſame latitude with the ſun's zenith, are always greater than the morning tides.* What can be the cauſe of this? Sir Iſaac Newton would anſwer, it is the centripetal force of the ſun, or moon, or both, depreſſing the waters, cauſing them to fly off from this very point, of which I affirm they gravitate, and by this depreſſion on their bowels, as it were, they flow more forcibly upon their ſhores.† But how doth it happen then, that this powerful depreſſion doth not prevent the riſing of the volatile particles of water? One would think that a power able to depreſs the very bowels of the ocean, would likewiſe prevent the aſcending of a much feebler body. But the contrary of all this muſt be true: the ſun, as De St. Pierre, and others, will allow, pumps up lakes of the liquid element, in a volatile form. This effect alſo, is moſt conſpicuouſly produced in the vertical point of the ſun, in this moſt conſpicuous non-reſiſting vacuum. The waters in this highly rarified vacuum, form a prominence in the vertical of the ſun round the globe, where there are waters for the purpoſe. Hence, as the ſun retires, this prominence, or projection, may be ſaid to commence a centrifugal motion, which motion will have a direct tendency to increaſe the flood on the ſhores. This is all that can be called centrifugal; and it proceeds from a cauſe, and in a manner entirely different to what the Newtonian ſyſtem teaches.

Now as the waters gravitate to this vacuum only, while the ſun is in the horizon,* (for the ſecond flux is an effect of the firſt) there is leſs exertion made towards the ſhores in the morning; and the tides are known to be leſs than the evening tides, in the ſame latitude. But theſe ſtatements ſuppoſe the ſun to be in the northern hemiſphere; for when the ſun is in the ſouthern hemiſphere, the focus of the tides is more remote, and the higheſt tides will be in the morning, in the northern hemiſphere; for more time is required for the ſame cauſe to ſend its effect in the ocean to ſo much greater diſtance. But if the tides had their focus in the polar fuſions, the tides would ceaſe when the ſun comes to the equator; for the fuſion of both poles ceaſe at this time, or are in equilibrio, or totally ſilenced, and the currents of either are at an end for a time; but it is certain that the tides do not ceaſe to ebb and flow during the equinoxes: hence, I think our lateſt and greateſt philoſopher aſcribed them to an improper origin; but he had a very plauſible appearance of truth on his ſide. The retardation of the tides may be aſcribed to the continual variation of their focus, both in latitude and longitude; but it will exceed my ſcanty limits to enter into a detail of ſo many particulars as are ſuggeſted to my mind on the occaſion. I have even forborne to notice in the text the effect produced by the light of a full moon, whoſe light, according to its degree, rarifies and promotes non-reſiſtance, as well as the ſun.

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* Theſe alterations in the fluxes of the oceans, De Saint Pierre aſcribes to the half-daily effuſions of the poles. With much deference to the opinion of a genius ſo much ſuperior to me, I muſt take the liberty to aſcribe them to a different cauſe. This great man ſeems to have comprehended every thing in nature, but the powers of this latent fire; which muſt have involved him in ſome miſtakes—but he hath graced them well.

† De Saint Pierre has ſufficiently refuted the Newtonian centrifugal and centripetal ſchemes; and has demonſtrated them to be as erroneous, as they are uſeleſs, in apprehending the laws of nature.

* In the horizon, &c. The full moon, according to the degree of her light, rarifies and diminiſhes elaſtic compreſſion; and being oppoſite the ſun, the ſecondary flux of the ſun is augmented thereby. This gravitation of waters to the vertical flame of the ſun, has been miſtaken for a fixed projection of the globe at the equator. All that is centripetal—

It is time to haſten to my next and laſt argument, to prove that the ſun's light gravitates under its vertical flame, a preponderating weight of waters, that cauſe and perpetuate the diurnal rotation of the earth upon her axis. The evidence I ſhall now bring forward, will put the truth of my theſis beyond controverſy; it is this: the motion of the earth is quickened, when the ſun paſſes from the equator into the ſouthern hemiſphere. The cauſe of this acceleration of the earth's motion, is obvious and rational, upon my new principles, as well as her nigher approach to the ſun at the ſame time, and from the ſame cauſe. It is well known to all who have looked into the maps of the globe, that the greateſt part by far of the eaſtern and weſtern continents lie north of the equator; and as this preponderating weight is formed only in the waters, the motion muſt be leſſened in proportion as the quantity of land is encreaſed in the latitude of the ſun.* Hence, then, as the quantity of land is diminiſhed in the ſouthern hemiſphere, the rarifaction upon the waters is more uniform and uninterrupted round the globe, and the preponderating weight

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is the elaſtic compreſſion of ethereal fire, in the abſence of the ſun; and this cauſes a kind of centrifugal motion, or flood, upon the ſhores.

* This new doctrine muſt ſtrike one ſtumbling ſtone out of the way of atheiſts, who could never reconcile this waſte of waters (as they call it) to the exiſtence of an all-wiſe Creator. It is certain there is but juſt enough of water, to anſwer the purpoſe of neceſſary motion in the globe.

of the waters is more ſteadily kept up, than in the northern hemiſphere; and the conſequence is, that which we yearly experience, the motion of the earth is accelerated, five or ſix days, when the ſun is in the ſouthern hemiſphere, where the waters are more generally ſpread round the globe. For the firſt time, then, this phenomenon is explained and rendered familiar; but on no other principle ever ſuggeſted, could this variation be accounted for. It has been ſuppoſed that it was owing to its nigher approach to the ſun, that its motion was quickened; but we ſhould rather ſay, the nigher approach of the earth to the ſun during our winter, in the northern hemiſphere, is owing to an increaſed degree of rarifaction in the ſouthern waters, which not only quickens the motions of the earth in her orbit, but alſo cauſes a more powerful gravitation of the earth towards the ſun.

But if all this is not ſufficient to ſupport my doctrine of gravitation and motion, I will add another inconteſtible evidence in ſupport of it; and that ſhall be drawn from the conſideration of the inequality of the earth's motion upon her axis, which cauſes the ſun to be, apparently, ſometimes faſt of clock, and ſometimes ſlow of clock.

If we examine into this caſe, we find that when the ſun, as we call it, gains of the clock, it is becauſe the quantity of waters are encreaſed under the ſun, and the motion of the earth is quickened; or when the ſun grows ſlow of the clock, it is becauſe the quantity of land, in which no motion is induced, is encreaſed under the ſun. Any man may diſcover the truth of this, by comparing the calculations in the almanack, of the variations of the ſun with the clock; and having a map of the globe before him, he will perceive that as the ſun recedes from his greateſt ſouthern declination, or tropic of Capricorn, which lies over the points of the eaſtern and weſtern continents, where the waters are moſt generally formed round the globe, and reſiſtance to motion is moſt diminiſhed of any part of the globe; that as the ſun approaches the equator, the two continents, but eſpecially South America, encreaſes in width towards the equator, and the conſequence is, that the motion of the earth is diminiſhed upon her axis; and the ſun, as by calculation appears, grows ſlow of clock from the latter part of December, which is the time of the ſun's leaving the tropic of Capricorn, until the rarifaction paſſes northerly of the greateſt eaſterly and weſterly projections of South America, to the iſthmus of Darien, where the Atlantic and Pacific oceans are ſeparated by a ſtrip of land only ſixty miles wide, and then the preponderating weight of waters is again encreaſed in the vertical flame of the ſun, as before deſcribed, the motion of the earth is again accelerated, and the ſun gains of the clock from the latter part of February, until it has paſſed north of the equator ſome diſtance, and the continent of Africa is projected far weſt into the Atlantic ocean, and counter-balances the narrowneſs of the iſthmus of Darien; and the variation of the ſun with the clock is very little for ſeveral months, that is, until the ſun approaches again near to the autumnal equinox, when the motion of the earth is again quickened upon her axis, and the ſun gains ſixteen minutes of the clock, by the laſt of October; after which, the rotation or motion of the globe is again impeded by the intervention of the widely extended land of South America; but this is of ſhort continuance; becauſe, as the ſun paſſes from the equator towards the tropic of Capricorn, the two continents, but eſpecially South America, diminiſh rapidly in width; and the rotation of the earth upon her axis is quickened ſixteen minutes from the 7th of November until the 24th of December. But we may obſerve, that this acceleration of the earth's diurnal rotation upon her axis, is always later than the cauſe that produces it; and alſo, that it will be continued in full effect ſome time after the cauſe that produced it, has evidently declined its power.

It ſhould be further obſerved, that notwithſtanding the great encreaſe of waters in the ſouthern hemiſphere, eſpecially when the ſun is at the tropic of Capricorn, the rotation of the earth upon her axis is not quickened in proportion to the encreaſe of waters round the

globe, the cauſe of which is very obvious: the gravitation of water to the vertical flame of the ſun, although it is greatly encreaſed all round the globe, or nearly ſo; yet it is formed at a leſſer diſtance from the axis of the earth than that which is formed at the equator, and conſequently has leſs power of promoting the rotation of the earth upon her axis. We may make the idea very familiar, by ſuppoſing a wheel, ſuſpended upon a ſhaft, or axletree, to be put into a circular motion by placing a weight upon one of the ſpokes of the wheel: we readily know that the nigher the axletree or centre of the wheel the weight is placed, the leſs will be its power of inducing motion in the wheel, &c.—Thus it is with reſpect to the diurnal rotation of the earth; a greater preponderancy of waters is formed towards the tropic of Capricorn, in the Southern Ocean; but they are formed at a leſs diſtance from the axis of the earth, and cannot induce that velocity of motion which the ſame quantity of waters would do, were they formed or projected by the vertical flame of the ſun at the equator, where they would be at a much greater diſtance from the centre, or axis of the earth.—This laſt circumſtance is ſo obviouſly true and plain to the weakeſt capacity, I think it muſt be admitted as concluſive of my doctrine of gravitation and motion.

It is very probable that if this globe was all water, or all a tranſparent ſand-ball, it would gravitate entirely to the ſun, or till it ſhould come within reach of the repulſive force of the ſun, which might alſo conſtitute this globe a comet. For as the reverberating rays of the ſun induce latent heat, more or leſs, according to the quality of that matter on which it is reflected; ſo is the force of gravitation determined in that body of matter towards the ſun.—But it is impoſſible for any globe of matter to fall into, or unto the ſun; for the reſiſtance of the ſun muſt be in proportion to that infinite or incalculable degree of condenſation of ethereal fire, which gives being to his inacceſſible light; which condenſation reſiſts the approach of matter, at certain diſtances, with a force almighty. Hence the amazing velocity with which a comet approaches the ſun, forces itſelf upon this reſiſting power, as upon the elaſticity of a yielding bow, to a certain degree, at which degree the power of elaſtic reſiſtance, like the bow ſprung upon the arrow, induces the retrograde motion, and the comet is ſhot out into ſpace incomprehenſible. And it may be further obſerved, that the power of gravitation will reach the comet at a greater diſtance than it will ſome other bodies, and cauſe it again to gravitate towards the ſun, in one eternal round of attraction and repulſion: and thus the laws by which comets are governed are diſſimilar to thoſe laws that govern other bodies; and this diſſimilarity originates in the quality of their own ſubſtances.

From the foregoing doctrine of gravitation and motion, we may alſo account for the ecliptic motion of the earth in her orbit. This I ſhall conſider to be induced partly by the alternate rarifactions of the ſouthern and northern hemiſpheres, and partly by the turning of the two polar regions alternately to the ſun, by that rarifaction. Either of theſe motions would be ſufficient to deſcribe the ecliptic; but if only one of them was ſuppoſed to be the whole cauſe, the period, it would ſeem, might arrive, when this motion would ceaſe, and fix the ſun in the equinox. We will ſuppoſe the ſun in the ſouthern hemiſphere, by which means the rarifaction round the globe is more towards the ſouth pole than the north; the conſequence will be, that reſiſtance is diminiſhed towards the ſouth pole, while at the ſame time denſation and elaſtic reſiſtance and compreſſion are encreaſing upon the northern hemiſphere: theſe united circumſtances muſt have a tendency to gravitate the earth towards the ſouth pole. Again, as this gravitation proceeds ſoutherly, it brings the ſun towards the equator, and its rays begin to reach the northern hemiſphere and weaken the elaſtic compreſſive force of the northern regions, at the ſame time as the ſun's rays leave the ſouthern pole. Reſiſtance to the ſouthern declenſion is made by an encreaſe of condenſation, which is an elaſtic oppoſition to the progreſs of the earth's gravitation ſoutherly, till by ſlow degrees her ſoutherly motion totally ceaſes. And, as it was obſerved of the ſun's oppoſition and repulſion of a comet, juſt ſo we may conclude the ſouthern hemiſphere operates upon the ſouth pole of the earth; her motion is ſtayed by ſlow degrees, which alſo cauſes, at theſe periods, ſuch little variation of time for ſeveral days, until the reſiſtance in the ſouthern hemiſphere is ſufficient to repel the earth into a retrograde motion towards the north. This retrograde motion is facilitated by the action of the ſun's light upon the northern hemiſphere, which in its turn is reduced to a non-reſiſting vacuum, or nearly ſo. Hence her northern declenſion proceeds on the ſame principles as her ſouthern, juſt deſcribed, and terminates in the ſame manner. But, as I ſuggeſted before, theſe motions might leſſen by degrees, and leave the ſun fixed at the equator; and, as D. St. Pierre obſerves, ſet the world on fire: but if we take into conſideration the other motion of the earth, viz. the alternate preſenting of her poles to the ſun, by the alternate rarifactions of the two hemiſpheres, we ſhall ſee, that theſe motions not commencing exactly together, there can no time arrive, when both will be ſuſpended at once; and the conſequence will ever be, that theſe motions will not ceaſe, unleſs the Author of nature counteracts their cauſe. I would be underſtood that of the two motions deſcribed, the retrograde motion from either of the poles is prior to that from the ſun. And we might, perhaps, add,

the inequality of the polar gravitations to the ſun, may be another cauſe of the eternal uniformity of theſe motions.

Let us try theſe principles once more, and apply them to the annual rotation of the earth round the ſun; and if they will appear to induce this motion, we ſhall have completed our preſent taſk, and, indeed, more than I expected leiſure to attend to.

We have already eſtabliſhed the principles of gravitation, and ſhewn them to be conſtituted in non-reſiſtance, (not magnetical attraction;) that this non-reſiſtance to motion or gravitation is induced by warmth, and that this warmth is generated by the ſun's light. We noticed, further, that as this warmth, or rarifaction, was encreaſed while the ſun was in the ſouthern hemiſphere, where the waters were more extenſive; that the earth approached nigher the ſun than when the ſun was in the northern hemiſphere, when the rarifaction was excited in a leſs degree, by reaſon of a diminiſhed quantity of water: by all which it is evident I am not miſtaken in regard of the true principle of gravitation. From the diurnal rotation of the earth upon her axis, there is a variation, even in the ſun's latitude, of the degrees of rarifaction: thus the vertical point of the ſun is the higheſt poſſible degree; and this degree, it may be obſerved, is ſubject to the leaſt denſation and compreſſion of any. Nevertheleſs, this very latitude becomes more or leſs compreſſed, in proportion to the length of time it is abſent from the ſun. The ſame holds true of all the intermediate degrees of rarifaction, north and ſouth of the ſun's zenith, to thoſe regions where rarifaction is in no degree induced. Now as the earth rolls eaſt, we will ſuppoſe that the part of the globe which undergoes daily rarifactions, and at the ſame time is ſubject to nocturnal compreſſions, muſt be that part which is about from forty-five to ninety degrees below the weſtern horizon, the ſun ſuppoſed to be in the meridian with us; the force of this compreſſion would impel the globe forty-five degrees above the horizon eaſterly: thus the part oppoſite the ſun, is the ſpace of the higheſt rarifaction, and cauſes the earth to gravitate directly towards the ſun: next, the part that laſt paſſed from the vertical flame of the ſun, is ſufficiently rarified to yield to the weſterly compreſſion, and is, by this compreſſion, impelled inceſſantly in this immenſe circle it makes through the heavens.

We have, ſo far, marked the outlines of our new ærial ſyſtem of gravitation and motion; and applied it to our inhabited globe. It muſt now be ſubmitted to the reader to determine its merits, if any there be, and make up his judgment on the whole. It is preſumed, however, that, notwithſtanding that ſtudied brevity and ſcarcity of proof unavoidable in the ſcanty limits preſcribed, the candid reader will confeſs the ſubject is fairly treated—the evidence

pertinent; and that the principles of gravitation and motion do appear to be founded in the various properties, ſtates and effects of the ethereal fire: that the doctrine, in all its parts, harmonizes, and moſt aptly applies to the rotations and motions of our globe; and, finally, that this conciſe ſyſtem of principles is conſpicuouſly calculated, not only to expoſe the vain attempts of many to explain theſe myſteries of nature upon principles foreign to the ſubject; but they may alſo ſerve as a leading clue to further improvements and diſcoveries in the ſubjects of philoſophical and aſtronomical electricity.

It is undoubtedly true, that there is now opened to view an immenſe field for enquiry and inveſtigation. All the wits and ſtratagems of philoſophers and academicians, to ſubſtitute a ſyſtem of principles whereby to explain the laws of gravitation and motion, are abſolutely abortive. They have forever miſſed the criterion, the hinge, on which the Author of nature has ſuſpended them altogether. How muſt the aſpiring genius be now rallied into a contemplation of this hidden power in nature, which has mocked all the reſearches of the wiſe and learned, eſcaped the piercing eye of a Newton, and ſtood aloof to the capacious ſoul of De Saint Pierre; refuſing to reveal herſelf to the wiſe and learned, hath finally made herſelf known to a babe, in compariſon with others.

Wake, then, ye FRANKLINS! and, like your predeceſſor, keep to the point. Unfettered, high-born republicans! unawed by the cenſure of critics, the puffs of coxcombs, or the ſcurrility of academicians, lay hold on the opportunity preſented for communicating a new and complete ſyſtem, whereby you will be able to explain all the myſteries of planetary and cometary aſtronomy: claim it as your native right. Franklin's ſhade beckons your attention to the ſubject: he led the van to the high improvement; but bequeathed the immortal honour of its completion to his countrymen. The feebleſt of you all has ventured, according to a common ſaying, to break the ice; but the ſubject is in embryo. More experiments, more enquiry and application, are neceſſary to complete the ſyſtem, and apply it generally to the ſyſtems of nature. My province is limited to the inveſtigation of medical electricity; and I ſhall, after a few more remarks, ſubmit the inveſtigation of philoſophical and aſtronomical* electricity to my ſuperiors.

From all the broken hints and ſcattered lights I have endeavoured to reflect on this new and intricate ſubject, it will appear ſufficiently evident, that the great Architect of the Univerſe hath poiſed the whole conglomerated cluſter of ſuns and ſyſtems upon this ſingle, latent, myſterious agent, called electricity, or ethereal fire: that by one form of it, all the other elements are locked as in eternal ice; by another, they are again liberated and put in motion: by one form of it, a tour of flight is prepared; and by another, they are impelled to purſue that paſſage: by one form of it, they preſs towards a centre; and by another, they are compreſſed or repelled from that centre. But there is alſo a difference in the effect, depending on the quality of the matter acted upon; otherwiſe our whole ſyſtem would be at an equal diſtance from the ſun, or would all commence comets: For the diſtance of every planet from its reſpective ſun, is determined by the degree of rarifaction which the ſun induces upon its ſurface; and I have clearly ſhewn, that the degree of rarifaction is determined by the quality of that matter the ſun's light is reflected upon. Alſo, the velocity of motion in each planet, is determined by the degrees of rarifaction promoted on its ſurface.

We have reaſon to believe, that all globes are compoſed of ſolids and fluids, as well as our own. It is very certain the moon is of a ſimilar compoſition. An extenſive liquid element is neceſſary to induce rotation on the axis; and this is neceſſary to conſtitute an annual rotation round the ſun: For in our globe, the annual rotation has its origin in the diurnal; and, without much knowledge of planetary aſtronomy, I venture to affirm, from a conviction of the truth of my ſyſtem, that there is an exact correſpondency between the different rotations of the planetary ſyſtems, reſpecting their velocity.

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* The term, aſtronomical, &c. elictricity, I have ventured to adopt, as it appears peculiarly applicable to my ſyſtem. It appears evident, that henceforth planetary aſtronomy, as well as cometary, muſt neceſſarily involve the ſtudy of electricity.

What ſhall we think now of the doctrine of our ſchools of philoſophy? They have taught us to believe the ſun is a globe of culinary fire—a furnace, like that of Nebuchadnezzar's conſtruction. Was that the caſe, it would form an infinite ſpace of non-reſiſtance, and its whole ſyſtem would gravitate to it, and be conſumed. Moreover, if it was elementary fire expanded, it would need fuel to ſupport the flame. This our philoſophers well enough conceived of; and in the diſorder of their theory, they tumbled comets, one after another, into his bowels, to perpetuate this imaginary kind of hell to creation, for ſuch it muſt prove. At another time, they have made theſe comets the main tranſports to convey the ſources of animation and life from ſuns to their reſpective ſyſtems: but, alas! what kind of ſuns ſupply this nutrition? Flaming volcanoes—millions of Ætnas united! We might think, were theſe comets of ſo much utility as tranſports, we might as well loſe the ſun, as loſe them. But when the foundation of any theory is falſe, the whole ſuperſtructure will be of the ſame texture. The notion of a comet being heated, at its perihelion, two thouſand times hotter than red-hot iron, is no leſs abſurd and erroneous. There is no doubt but that a degree of warmth is preſerved in the comet, at

its perihelion; but we cannot admit the idea of ſuch amazing viciſſitudes, eſpecially if we ſuppoſe them to be the habitations of beings: Let us rather ſuppoſe, that as the comet approaches the ſun, and comes within his repelling force, the circumambient ethereal fire of the comet is repelled from its front, which we know is the caſe; and, conſequently, that the action of the ſun's light is leſs refractive, or reverberatory, and induces leſſer degrees of heat, in proportion as the vehicle of light is diminiſhed. Moreover, it is certain, that if the comet was no hotter than we can heat iron in a furnace, we ſhould not ſee that luminous tail, oppoſite the ſun: Was ſuch a heat to pervade the comet, the rarifaction would extend all round the comet. But this luminous appearance muſt ariſe from the effuſion of ethereal fire, and muſt have for its focus a denſity in proportion to the effuſion: the focus is ſtill in the part of the comet oppoſite the ſun. Again, did not darkneſs pervade the part of the comet oppoſite the ſun, we ſhould not be able to diſcover this fuſion, no more than we can diſcover the fuſions of the ethereal fire from the polar regions, called the aurora-borealis, in the day time. But how can we ſuppoſe the comet thus heated, and at the ſame time not illumine the regions all around it, and ſo deſtroy this denſity, which is known by the degrees of exiſting cold, or, by its light, prevent our being able to diſcover the illumination of its fuſion?

Finally, we muſt conclude that there is a counterpoiſing power, whether we can account for it or not, that apportions means to their ends, and harmonizes all the works, laws and movements of nature. But admitting the comet is heated two thouſand times hotter than red-hot iron, our philoſophers might bluſh when they tell us of ſtorms of hail, ſnow, &c. in the atmoſphere of ſuch a comet.

There are many more points of view in which I ſhould conſider the cauſe, the power and effect of this ſubtile effluvia. I would ſhew that the motion of the earth upon her axis, was one cauſe of the aurora-borealis; and the ſucking of wind from a warmer region, conveyed this friction into the horizon—the cauſe of its not aſcending ſo high in the ſummer of the northern hemiſphere, as in the winter. I would further ſhew, that the exiſting degree of cold was a proof of, and the criterion by which you may know the preſent denſity of the ethereal fire.—I would prove it by the coruſcations that may be induced, by ſtroking your hand upon the hair of ſome animals, in a very cold day—by coruſcations that have ſometimes alarmed people, when putting off woolen or flannel cloathing in a ſevere cold night. But I muſt wave all further notice thereof, until I have more leiſure, and a more favourable opportunity of doing juſtice to a ſubject of ſo much intricacy.

We will, reader, if you pleaſe, make one uſe of the foregoing doctrine. Under the enlarged view in which we have conſidered ethereal fire, it appears, as it were, almoſt the Deity of nature. Was it not a myſterious inſtinct, that hath led ſo many of the untutored tribes of the earth, to pay divine honours to the ſun, and even to fire, in ſome inſtances, as being of the ſame ſpecies? The ſun appears to be, in the natural world, what God is in the ſpiritual; there ſeems to be a ſtriking analogy exiſting between the natural and ſpiritual world. The celebrated founder of the Moravian Church, laboured ſucceſsfully to illuſtrate this. Indeed, that teacher who came from God, taught the doctrine of the ſpiritual kingdom, by ſimilitudes borrowed from the natural world. We have, in the ſubſequent pages, conſidered the ſun as the conſummation and infinite fountain of ethereal fire; that his very preſence gives law to his whole ſyſtem: what a figure this, of its Divine Author! the glory of whoſe preſence, executes all his will; ſo we read, *Exodus* xiv. 6, 24. "*The Lord looked upon the hoſt of the Egyptians, through the pillar of fire and of the cloud, and troubled the hoſt of the Egyptians.*" The preſence of the natural ſun produceth different effects, according to the quality of the body preſent; ſo is the ſpiritual Sun: His preſence is a ſource of eternal tranſport to the moral ſoul; but to the immoral, "*devouring fire and everlaſting burning.*" Again, there is a participation of the ſame element as the natural ſun diffuſed through all the natural world, by which means they are all ſubjected to his laws—are of animals and vegetables ſuccoured, nouriſhed and preſerved in life; ſo it is with reſpect to the ſpiritual Sun, wherever there is a participation of the ſame nature of the ſpiritual Sun, throughout all moral intelligences, the preſence of the ſpiritual Sun imparts ſpiritual nutrition, increaſe of grace and joy in God. This is the Father's cultivation of the branches in Chriſt; "I will manifeſt myſelf unto you;"—"if I depart, I will ſend you the comforter;" I will not leave you comfortleſs. As if he had ſaid, have I taken care of the natural world, that the ſun of nature ſhould not ceaſe to beſtow its enlivening preſence upon all the animate world that live by a participation of the ſame element; and will I deny the joys of my preſence to thoſe who, by the ſame ſpirit, are become one with me; no, "ye ſhall be loved of my Father, and I will love"—"we come unto you, and make our abode with you."

But there is a gloomy diſparity preſented to our view, between the natural and ſpiritual world; there is no exception to this participation of the element of the natural ſun, throughout the whole family of animals and vegetables; they all live by this participation, and are all nouriſhed by the preſence of the natural ſun: but not ſo in the ſpiritual world, or among the whole family of moral intelligences; for we experience daily what we read; "The fool hath ſaid in his heart, there is no God;" no Sun of the ſpiritual world; ſo groſs is his darkneſs. "They deſire not the knowledge of God," there is no ſpiritual Sun for them. "Ye have both ſeen and hated, both me and my Father;" the ſpiritual Sun is offenſive to theſe. But I need not enumerate paſſages; theſe are ſufficient to ſhew, that the natural world preaches the doctrine of man's depravity, and teſtifies in behalf of its Divine Author, that "a man muſt be born again before he can ſee, (can *ſee*—a remarkable expreſſion) the kingdom of God." As if he had ſaid, there is no life, no animation in the natural world, but by a participation of that ethereal fire, which conſtitutes the ſun of nature; and by which participation alſo, the ſun of nature becomes a quickening power in the ſubject of that participation; ſo it is in the ſpiritual world, "except a man be born again, or except ye be baptiſed with the Holy Ghoſt and with fire (ſee the analogy) ye cannot ſee the kingdom of God;" ye can have no poſſible conception, not the fainteſt idea of the glory of the ſpiritual Sun; he is ſeen only by a participation of his likeneſs; hence our dear Redeemer affirms this important truth as it were by an oath, "Verily, verily I ſay unto you, except a man be born again, he cannot ſee the kingdom of God." I think we have found one text in the volume of nature, that ſtrongly teſtifies the ſame important truth: So God and nature are not at variance. *And we may add, it was meet the ſun of nature ſhould put on the ſable mantle, when the ſpiritual Sun agonized on the croſs.*

From a conſideration of the exquiſite powers, which the Author of nature hath inveſted in this ethereal fire, we may be naturally led to expect, at leaſt, that there may be ſome extenſive uſe made of it as a remedy of diſeaſes in the human body. The various modes in which it may be adapted to our uſe, the velocity of its motion, the fineneſs of its particles, the pureneſs of its nature, the immenſe number of effects it produceth, the harmleſſneſs of every effect, when carefully applied, would ſuggeſt to us, the propriety of an extenſive experiment, and the probability of great ſucceſs. Can we ſuppoſe that nature hath endowed this element with ſo many aſtoniſhing powers, that all creation is nouriſhed and ſupported by it, and that none of theſe inveſted powers can be made uſe of in curing diſeaſes—that we muſt look for no aid in this reſpect, but from the fugitives of nature? or is this the interdicted fruit, and all mankind filially obſequious of late? or do we, as the Jews in another caſe, judge ourſelves unworthy of the bleſſing? or are we diſguſted at the allegorical alluſion it bears to the ſpiritual world, to baptiſmal fire, that ſanctifies the ſoul from ſpiritual diſeaſe; that we will not, by terreſtrial fire, purge the body from its diſeaſes? I will here confeſs, that I believe the Millennium is at the door; and that this ethereal fire will be as conſpicuous a mean of purifying the body from diſeaſe in that day, as the fire of the ſpiritual kingdom will be, in purifying the ſouls of men; and that the publication of this medical treatiſe, is not without the intention of Heaven.

I ſhall then, in good conſcience, and in obedience to God, and love to my fellow-creatures, preſent them with a ſyſtem of principles, and of practical rules, in a plain, familiar manner, whereby any man of common ingenuity may have a full underſtanding of the nature, properties and effects of this powerful remedy of diſeaſe, and be informed in what manner he muſt apply it in all caſes.

CHAPTER II.

Of the conductors of the ſhock in the human body—An exceſſive action of the ſhock deſcribed—A moderate action an infallible cure of fever and inflammation—A weak action peculiar to caſes of debility—Of inſolation, its action a direct ſtimulus—Proper mode of uſing it, &c.

Of the Conductors.

TO underſtand the manner in which the electric ſhock is conducted through the human body, is a matter of no ſmall importance to a thorough inveſtigation of the ſubject of medical electricity. To know whether it is conducted by the bones, muſcles, fluids, or all three, is a matter of enquiry, and demands our firſt attention, that we may know, in general, what effect the ſhocks are likely to produce in the body.

Thoſe who have been acquainted with electrical machines, muſt neceſſarily know that there is a great diſparity in the aptneſs of ſome conductors, compared with others; and that the ſhock will incline altogether to that conductor which is the moſt apt or ſuitable.

Thus—1ſt. quality, metalic ſubſtances.
2d. ——— water, blood or liquids.
3d. ——— animal bodies.
4th. ——— green wood.
5th. ——— dry wood, earth and the like.

Let all theſe different conductors be preſented at once to convey an electric ſhock, and the moſt ſuitable, viz. the metal, will receive and convey the whole, or nearly the whole quantity or charge contained in the receiver. Again, if you remove the metallic conveyance, and paſs the ſhock as before, it will fall upon, and be conducted by the pure liquid element; if you remove the pure liquid element, and paſs the ſhock it will fall on the human body, remove the human body, &c. and the ſhock will paſs on the green wood; and laſtly, it will paſs, though very imperfectly, upon dry wood, dry earth, and many other the like ſubſtances; but the action could not be perceived in the human body, when theſe deficient conductors form any part of the conveyance with the human body, admitting the quantity is not exceſſive.

I have placed the human body below pure fluids, and for this obvious reaſon; there is a ſcantineſs of fluids on the ſurface, eſpecially at times, which impedes the motion or force of the ſhock, and this impediment would be ſufficient to turn its flight upon pure fluids, to which it has free acceſs.

Let theſe reaſonings be applied to the human body, and we ſhall diſcover at once, that the fluids are the principal conductors of the electric ſhock; and as the blood makes the greater part, the blood doth conſequently receive and convey the ſhock through the body.

An exceſſive action of the ſhock deſcribed.

To illuſtrate and render familiar the action of this elmentary fire in paſſing an animal body, or the invariable effects produced thereby, we ſhall be aſſiſted by obſerving the effects produced by an over-action thereof. Dr. Franklin's experiments having put it beyond all doubt, with thoſe who have any information on the ſubject, that this elementary fire, which we call lightning, is to a demonſtration the ſame in quality, and in the effects it produceth, as that fire promoted by the artificial machinery,* my taſk is rendered the lighter. This being granted, we will draw all the information from this ſource that can be obtained at preſent, to aſſiſt in our enquiry. When a perſon is ſlain by this over-action of the ſhock, I ſuppoſe it may be ſaid that they die of total atony and laxity; that is, the diſtenſive force of the ſhock hath deſtroyed every degree of tone and tenſion thro'out the vaſcular ſyſtem. The expanding, diſtending properties of this ethereal fire, are capable of performing this without rupturing the veſſels. But its power of ſwelling the diameters of the veſſels is ſo conſpicuous, that it is found, by diſſection, that the veſſels are frequently ruptured in thoſe who have received a large quantity from a thunder-cloud. This circumſtance of the veſſels being burſt or ruptured, is the leading clue, by which it is eaſy to

diſcover, not only that the blood conducts the effluvia through the ſyſtem, but alſo that very peculiar effect of the ſhock upon the veſſels, which, if tempered by art, may be conducive of the moſt happy conſequences: For it is incontrovertible, that if an exceſſive quantity of electricity is capable of reducing tone and tenſion, in an inſtant, to that degree of laxity which terminates in inſtant death, to ſilence at a touch, viz. by a violent diſtenſion, the whole vaſcular ſyſtem, that they cannot embrace the fluids any more than an artificial tube; it follows, that was this power temporized by art, adminiſtered in form and quantity, ſuited to the exigency of any encreaſed degree of morbid tenſion, as in a fever, or inflammation of any kind, it muſt be adequate to the taſk of reducing that ſuppoſed tenſion, at the leiſure of the electrician.

Another effect produced by this exceſſive action, is very conſpicuous, and deſerves our attention. This is the effect produced on the pores: this element paſſing in great profuſion through the body, filling every part, blows open the pores, in an exceſſive degree, when the quantity received into the ſyſtem is exceſſive.

It is undoubtedly true, that if a perſon's cloaths are dry, the whole body of fire is conducted through the ſyſtem by the fluids; notwithſtanding, this effluvia preſſes towards the ſurface, and through the pores, with ſuch violence, that any covering upon the body that is not ſufficiently porus, is fractured, or blown entirely from them: this is the caſe with ſhoes and boots, through which the paſſage is not ſufficiently free; but it perſpires linen or woollen ſo freely, that they are ſeldom or never fractured. Thus it perſpires the whole body of muſcles (the blood-veſſels excepted) ſo freely, that they never appear to be wounded, unleſs in ſome very extraordinary caſe. But the veſſels, which contain the conductors, upon which this expanding, diſtending element falls with great freedom, will be frequently ruptured, or burſt.

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* Vide chap. 4, p. 216, 217.

My reader will pleaſe to excuſe me, in noticing any occurrence that may reflect light on this intricate ſubject. It occurs to my mind, that one or two reſpectable men, who have tanned the hides of animals which have been ſlain by the over-action of this ethereal fire, from the cloud, told me, their ſkins would not make firm, impervious leather; the pores in the ſkin were ſo expanded, dilated or enlarged, that the aſtringency of the bark was not ſufficient to render it equally firm with other leather.

The diſtending, expanding, dilating properties of this powerful agent are viſible in its effects every where upon inanimate ſubſtances: theſe I ſhall leave to the reflections of my reader; and ſhall draw a ſecond inference from this over-action of electricity on animal bodies. What naturally reſults from the before recited facts is very obvious—needs hardly any comment. Any man of the leaſt diſcernment muſt diſcover at once, that this is an agent againſt a checked perſpiration; that if adminiſtered in due degree, by the artificial machinery, muſt be of ineſtimable uſefulneſs in fevers, inflammations, peripneumonies, pleuriſies, St. Anthony's fire, and in ſome kinds of dropſies, &c. &c. That when we compare its effects on the veſſels, and in promoting perſpiration, we have reaſon to believe that mankind will ſoon derive ſome important relief from diſeaſe, by a judicious application of this ſubtile effluvia.

A due proportion, an infallible cure for fever and inflammation.

I KNOW of no fever without tenſion and retenſion; in ſhort, this is what conſtitutes a fever, and to remove theſe is to cure a fever. This, I believe, will be readily granted, by any one who has a knowledge of the nature of fever. It amounts to a certainty with me, that if an exceſſive action produces the effects deſcribed under the laſt head, which I think no one will deny, we have juſt now diſcovered a medicine of the laſt importance to mankind—a ſure, a ſafe and an eaſy remedy for the moſt dangerous, painful and moſt fatal of diſeaſes, and which have been but very imperfectly reſiſted by the beſt medical aid hitherto afforded. Electricity produceth that very ſingular effect, juſt that which is wanted to remove fever, and for which innumerable means have been uſed to little or no good purpoſe.

Indeed, the cure of a fever, by any other means, is exceedingly embarraſſed; hence the beſt medical aid generally afforded, goes no further than to make ſome neceſſary evacuations, &c. Something like a mariner, who uſes all his ſkill to navigate his veſſel in a tempeſt, which he cannot run into a ſafe harbour. When we look into the nature of fever, and obſerve the retenſion of the perſpirable vapour, the tenſion of the veſſels, the diminiſhed ſtate of their diameters, the violence with which they embrace their fluids, their encreaſed laborious action, phyſicians are ſometimes induced to tap a vein, to leſſen the quantity of fluid: this will give a temporary relief, and it is but temporary; the pores are yet cloſed; the fever heat cannot be abated, unleſs a diaphoreſis is induced; the retained heat will bring down, in a ſhort ſpace, the diameters of the veſſels, to embrace the diminiſhed quantity of blood with equal violence, and all the ſymptoms of diſtreſs will be renewed. If we contraſt the uſe of letting blood in this ſtate of the ſyſtem, with the electric ſhock, conſidering the effects produced thereby, we ſhall diſcover an infinite diſparity in the two, a vaſt diſproportion as to the aptneſs and ſuitableneſs of the one compared with the other. The diminiſhing the quantity of fluids is, at beſt, but a temporary abatement of pain and diſtreſs; doth not, in the leaſt degree, affect the original cauſe, or what conſtitutes fever, viz. tenſion and retenſion: But the electric ſhock, adminiſtered in due proportion, goes to the very bottom of the cauſe: the elaſtic ſpring imparted to the veſſels, by the flight of this dilating, diſtending element, being conducted through the veſſels by the blood, ſoftens the action of the veſſels, by enlarging their diameters; conſequently they embrace the blood with leſs tightneſs, and there is an immediate abatement of pain, &c. This, however, muſt be purſued to a certain degree, that is, until a free perſpiration is eſtabliſhed; otherwiſe the relief obtained will be but temporary, like that of letting blood; for there is no ſuch thing in nature, as a cooler in fever, properly ſo called, but that which induces perſpiration, or, if you pleaſe, ſweating: no fever is radically cured, but by this evacuation. A fever hath its firſt riſe in the ſuppreſſion of perſpiration, and thoſe that become bilious from the ſame cauſe. To deſiſt the electric ſhock before perſpiration is eſtabliſhed, would be to leave the cauſe of heat unremoved; and the conſequence will be, that whatever degree of tenſion you took off by the ſhock, will be recommenced, and will be all of a piece with letting blood. But as it hath been demonſtrated, from the over-action of the ſhock, that a due proportion may be found that will anſwer this purpoſe, either in the quantity of the charge, or the number of the ſhocks, there is nothing doubtful of ultimate ſucceſs, wherever there is a judicious and careful attention paid by the operator.

There is little reaſon to ſuſpect that a redundency of blood, or a full habit, hath any thing to do in promoting fever; it is rather probable, that the exceſſive action of a fever ariſes from ſome previous inaction from languor, from ſome deficiency or debility of the direct or indirect kind. Fever is as frequent in a penury of fluids, as in ſanguine habits; and to have recourſe to phlebotomy or blood-letting, in any ſuch increaſed degree of morbid action, is miſerable, whether it be in fever, pleuriſy, or in peripneumony. Again, in every prediſpoſition to fever, there is more or leſs deficiency in the ſecretions, a vitiation of the humours, a coagulation of blood not duly mixed. The rarifaction of fever heat doth not remedy all theſe diſorders in the ſyſtem; they all call for the aſſiſtance of the electrical effluvia upon them: hence, in every point of view in which we may conſider electricity, we find an encreaſing value in it, an encreaſing dependence upon it, an encreaſing bleſſedneſs to be derived from it. It appears to me, and I think I ſhall make it appear ſo to others before I cloſe theſe pages, that had we aſked of Heaven, and had Heaven granted to us one mean of health, ſhort of miracle, we could not conceive of any thing

to anſwer ſo many valuable purpoſes. It is conſpicuouſly ſo in the ſtate of nature: from its properties, in ſuſtaining, enlivening, accelerating and animating the whole animal and vegetable creation, we conſidered it as the ſoul of the univerſe; and when it is truly improved by art, or artfully adapted to medical purpoſes, it appears to tranſcend all other bodies, as it doth tranſcend them in ſupporting life in the ſtate of nature.

It is too far plain to need any comment, that any medicine, agent or power, which, when ad-adminiſtered in a great degree, is capable of ſwelling or dilating the veſſels till they are ruptured or burſt; and that a leſſer quantity, duly apportioned to the exigency of tenſion in a fever, ſhould not be able to remove that tenſion. It is equally impoſſible, that, in the over-action of that ſame power, agent or medicine, there ſhould be ſuch a violent preſſure, oozing or blowing through the pores, as to affect the ſkin of an animal, as before deſcribed, or to blow boots and ſhoes from the legs of a man; and at the ſame time, a diminiſhed quantity apportioned to the exigency of a ſuppreſſed perſpiration in a fever, inflammation, cold, or whatever may cauſe ſuch ſuppreſſion, which ſhould not be removed by this ſame agent. I think it is now made evident, and muſt leave a conviction on the mind of every judicious reader, that electricity is a peculiar, and an infallible remedy for fever and inflammation.

A deficient degree only, is proper in caſes of debility.

MEDICAL electricity hath been greatly diſgraced by an improper adminiſtration thereof, in many reſpects; ſometimes by applying the ſhock only, when inſolation was more proper; at other times, by inſolating only, when the ſhock was more neceſſary; ſometimes by electrifying a part, or ſeat of complaint, which had for its cauſe the general diatheſis, without electrifying throughout the ſyſtem, to remove that diatheſis. But what hath been of a worſe conſequence than all the reſt, is a total neglect of the patient's temperature of air; that is, to keep the patient from every the leaſt degree of coolneſs during the operations of electricity, and for ſeveral days after the operations of electricity are deſiſted. But what I mean particularly to reprobate in this place, is the impropriety of ſtrong ſhocks in caſes of debility. There will be, however, a temporary ſenſation of debility experienced from the continuation of the lighteſt ſhocks; inaſmuch as the moſt gentle electrifications will, if continued, attenuate the fluids, promote perſpiration, and, by a kind of rarifaction, or frictional heat, propel off air contained in the blood-veſſels, and in every part of the ſyſtem; by which means, all the veſſels become leſs diſtended, and conſequently, a ſenſation of languor is experienced. This, however, is no argument againſt the propriety of uſing electricity in caſes of debility; for notwithſtanding this ſeeming debility, the ultimate termination of the proceſs is, the ſyſtem is purified of vitiated humours, the ſecretions are accelerated, and the digeſtive powers are invigorated, and an appetite for food is the common conſequence; and, by this proceſs, more food is taken and digeſted, more nutriment is ſupplied to the ſyſtem, and the veſſels are repleniſhed with vital ſtimulus, and the whole ſyſtem is thus invigorated. But the over-action of the ſhock is much to be dreaded in caſes of debility. What this over-action is underſtood to be, hath been before explained; it is a reduction of the tone and tenſion of the veſſels in particular: there is an equality of tenſion on the whole muſcular ſolids undoubtedly; but the over-action of the ſhock is experienced in the veſſels chiefly. If the ſhock is ſufficiently ſtrong to ſpring, to diſtend or dilate the veſſels, it weakens and diminiſhes their power of propelling on the blood contained in them: hence if the circulations are already too languid, it is madneſs to add to their degree of languor, which hath been the caſe ten thouſand times, and hath been one cauſe, among many others, of keeping medical electricity in diſrepute, almoſt from the firſt diſcovery of it. But as the peculiar effects produced by the ſhock are now clearly underſtood, it is hoped that theſe improprieties will be avoided in future.

Of Inſolation.

THIS ſubtile electrical effluvia, or elementary fire, hath been conſidered as the principal agent of the animal and vegetable life; that its action was a direct ſtimulus; that a deficiency of it, which is ſometimes cauſed by heat, endangers diſeaſes of debility; that in this deficiency, however, is founded the laws of gravitation and motion; and that the laws of nature were ſo arranged, that temporary ſupplies ſhould be occaſionally imparted, in ſuch a manner and degree as not to impede the laws of gravitation and motion on the one hand, nor ſuffer animal and vegetable life to periſh on the other. We come now to the conſideration of the artificial ſupply of this ethereal fire, and the inveſtigation of its effects. Seeing this element is evidently the grand principle of animal life, and we have, either by the interpoſition of Heaven, or by a miraculous ſtretch of human genius, or ſimply by good luck, obtained means of converting it to our uſe in many forms, it would ſeem, as I ſaid before, that if art hath any thing to do in improving nature, common prudence would ſuggeſt that we no further neglect to improve, for our uſe, the moſt eſſential mean of health to be found in the univerſe, nor ſpend our labour and ſkill upon (comparative) inſignificancies. Not that I mean other medicines ſhould be neglected: many of them are, and undoubtedly always will be, neceſſary to the cure of diſeaſes. But what I mean is, that there are

already a ſufficient number of valuable medicines diſcovered, to aid electricity in the healing or preventing nearly the whole catalogue of diſeaſes; and that electricity hath been neglected, to the great detriment of mankind. I am not, however, of the opinion of ſome, that this hath been a wilful neglect, fearing leſt it ſhould become too familiar; that every one would be in poſſeſſion of ſo great a mean of health, that the faculty would be injured thereby. Every conſideration that hath induced me to publiſh this treatiſe, ſtands oppoſed to that idea: I know that medical electricity hath never been underſtood; that the ſubject is very occult; that thouſands, in all probability, yea, undoubtedly, have gone about the buſineſs with an intention to do their utmoſt with it: But the adminiſtration of it requires ſuch minuteneſs of ſkill, and this hitherto to be obtained only from long practice, that many, before they had acquired that neceſſary ſkill, have flung by the whole buſineſs in deſpair, or only uſed it afterwards for a paſtime. I have known phyſicians to die of diſeaſes, with their machines by them, of which, had they underſtood them, and known what is now known, they might eaſily have cured themſelves. So I conclude, that had phyſicians abſolutely known the medical uſe of electricity, and been cruel enough to refuſe it to their neighbours, they would never have refuſed it to themſelves and their families.

The artificial inſolation is not yet fully underſtood: The moſt that can be ſaid is by way of inference, from the conſideration of its being naturally, or in the ſtate of nature, the animating, quickening and ſuſtaining principle of life and motion, and from the trifling experiments that have been as yet made with it. I ſay trifling experiments; for the greateſt continuations of inſolation have been but ſhort. The artificial inſolation produceth no effect longer than during the time the perſon is upon the inſolating ſtool or ſtand: as ſoon as he ſteps off that ſtand, he loſes the plus electrification; he is on an equilibrium with thoſe ſubſtances he ſtands connected with. What if an opiate ſhould loſe all its effect in that ſhort ſpace of time which people commonly ſtand electrified? It would ſoon loſe its high eſtimation too. The artificial inſolation, or filling the body with this elementary fire, diſcovers itſelf in ſeveral particulars; ſuch as an acceleration of the circulations, warmth, and, when carried to a high degree, a vertigo, or ſwimming in the head: This vertigo is undoubtedly formed by a redundency of blood, flung into the head by the ſudden action of the veſſels. A few ſmart ſhocks paſſed from the ſides of the neck to the feet, will immediately remove this diſorder, by ſoftening the action of the veſſels in the lower extremities, and then the inſolation may be continued; or, in a weakly perſon, it would be beſt not to carry it ſo high, or, to remedy it,

to paſs the ſhocks from the hips to the feet only.

The ſenſation of warmth experienced, is the effect of the inſolation, and ariſes from the acceleration of the circulations. It is found by experiment, that the pulſe is quickened two or three pulſations in half a minute. This acceleration of the circulations cannot ariſe from any degree of tenſion that might be ſuppoſed to be induced in the ſyſtem, becauſe it is almoſt inſtantaneous with the firſt inſolation; wherefore, it muſt ariſe from a cauſe independent of tenſion, or at leaſt any ſuddenly-increaſed tenſion. It is undoubtedly occaſioned by the operation of this active principle of life on the fluids independent of the veſſels. It is the inſeparable property of this effluvia, when attached to light bodies, to repel them aſunder by the globular atmoſpheres condenſed around them: thus when this ſupernatural quantity is added to the natural (the natural itſelf being active) the ſupernatural, or artificial quantity encreaſes the action of the natural; by ſtimulating the globules of blood with higher and more active atmoſpheres, filling the veſſels, buoying up the fluids, they flow with more freedom and vigour, with the ſame exertion of the heart and arteries, the ſame tenſity of the veſſels.

Thus, the operations of the artificial, or ſupernatural quantity, prove my hypotheſis concerning the natural quantity, to be true, viz. that this elementary fire is the ſoul of the univerſe, the all-ſuſtaining, animating, pervading principle of life and motion in the animal and vegetable creation: and the operations of the natural quantity prove, to a demonſtration, that the artificial, or ſupernatural quantity ſupplied by art, is an additional ſupply of the vital principle of all animation and life. But here may ariſe a queſtion—May not the excitement of this artificial inſolation be carried ſo high as to induce indirect debility? To which I anſwer, it is not likely that any conſiderable inconvenience would ariſe from a high and lengthy inſolation, eſpecially if the veſſels in the lower extremities were once in a day or two ſlackened in their action by a few ſhocks ſufficiently ſtrong for the purpoſe, to prevent vertigo: moreover, the encreaſe of the natural quantity, from ſummer to winter, is an encreaſe of health and vigour; and the continuation of this denſity of electric fire through the cold ſeaſon, is a continuation of health, and leſſening the number of diſeaſes among mankind. In a high ſtate of artificial inſolation, there will be promoted a perceptible perſpiration; ſo that I cannot diſcover that it forms any kind of prediſpoſition to fever or inflammation. This element we call fire, when expanded, is in an undiſturbed ſtate, far from what we call warmth; it is only capable of firing combuſtibles in the inſtant of its expanſion.—You may charge a caſk of powder, or a glaſs of rectified ſpirits with this fire, and it will pro-

duce no viſible effect; but if you expand the element, by taking off a ſpark, it will take fire or flame. This element is itſelf cold, but by its activity on the animal life, produceth warmth: it is diſſimilar to all other things in nature, and we cannot conceive that any degree of it is dangerous, merely becauſe other ſtimulants in great degrees are dangerous.

Inſolation a direct ſtimulus.

FROM all that hath been ſaid on the ſubject of inſolation, it is manifeſt enough, that it is a very diffuſive, active ſtimulus; that it hath an inſtantaneous effect on the circulations, in quickening and invigorating the animal powers; and, as ſuch, it may be denominated a direct ſtimulus.

From all that I have been able to aſcertain of medical electricity, in more than ſixteen years practice, I have denominated a ſtrong action of the ſhock to be a direct debilitator; the action of very weak ſhocks, to be an indirect ſtimulus; and the action of inſolation to be a direct ſtimulus. A very ſtrong ſhock abates the vigour of the animal functions, and may reduce them to inſtant death. Some would have this called indirect debility; but as there is no ſpace of time between the firſt action and the debility, I think it is more properly denominated direct debility. The electric ſhock, in the lighteſt degree of it, cannot be conſidered as a direct ſtimulus; for if the lighteſt ſhocks are frequently repeated, they induce a temporary ſenſation of debility, in the manner before deſcribed; but they may be conſidered as an indirect ſtimulus; for, inaſmuch as a continuation of the gentle electrification induceth warmth, this warmth has a tendency to induce tenſion and vigour. Moreover, the digeſtive powers are aſſiſted directly by the operation; and ſo the ſyſtem becomes invigorated by a kind of ſecondary cauſe; wherefore I have given it the name of indirect ſtimulus.

But filling the body with this elementary fire, produceth an effect quite different to any other mode of application. It operates ſomething like an opiate, but more ſuddenly, and affects the ſyſtem differently: an opiate accelerates the circulations, by inducing tenſion on the veſſels; but this ethereal effluvia, by affecting the fluids primarily, and the veſſels ſecondarily, as hath been already deſcribed.

It is evident from every conſideration of its effects, that it ſhould never be uſed in any ſtate of increaſed pulſation, or morbid excitement. It is equally evident, that it is peculiarly uſeful, and ought ever to be uſed in caſes of deficient excitement, languor of pulſation, feebleneſs of body, coldneſs, and to prevent the periodical return of an ague, &c.

This ſtimulus being ſo harmleſs in its nature, ſo operative in its application, calls for more attention, methinks, from the gentlemen of the faculty.

Proper manner and means of inſolation.

NOT only the ſhortneſs of the time, but alſo the weakneſs of the degree, have both conſpired to render inſolation a mere inſignificancy. It hath been obſerved before, that the plus electrification ends with the perſons ſtepping off the inſolating ſtool or bed, &c. The perſon is reduced to an equilibrium with thoſe ſubſtances with which he ſtands connected; he retains no more than his natural quantity, and the ſupernatural, or artificial, ceaſes to produce any viſible effect; eſpecially when it hath been continued but an hour, or perhaps not half that time, ſeeing it doth not immediately induce tenſion of the veſſels; and if it doth produce that effect in any degree, after long continuance, which is not fully proved, it cannot be expected that a ſhort inſolation ſhould be of any conſiderable importance. It remains, then, that in order to aſcertain the utmoſt benefit to be derived from this ſource, there ſhould be a continuation of the inſolation for days, weeks, or months, as the caſe may require. There is reaſon to believe that caſes of deficient excitement may be relieved by ſuch a proceſs, in a manner moſt agreeable to nature; it is that mean of excitement, that criterion of life, that ſource of animation, on a competent ſupply of which is ſuſpended all animal and vegetable life. When a deficient excitement is reſtored in this manner, it is done in perfect conformity to the laws of nature. There can be no direct debility, but what muſt originate either in a deficiency of this ethereal fire, or in too much abſtinence from diet, &c. And I am moſt apt to believe, that the debility doth generally originate in the former; and that if the debility ſhould be found to have its ſource from that cauſe, we may be enabled to diſcern the cauſe of ſo much embarraſſment in reſtoring diſeaſes of this deſcription by tonics, by diffuſable ſtimulants, by the more durable, &c. of food, during the hot ſeaſon, or while the natural quantity of this ethereal ſtimulus is deficient. Is it not evident, after all, that the patient muſt generally wait for the completion of the cure, till the cool ſeaſon returns? that is, in ſhort, till common air is again repleniſhed with an encreaſed quantity of this pure, this ſalutary, this univerſal, unſullied principle of all animation and life; and it is almoſt in vain to attempt any ſubſtitute for this agent of life, when it is evidently deficient in its natural quantity or quality. So neceſſary is this element to life, ſo exquiſitely adapted to the very exiſtence of the animal being, to ſay nothing of the vegetable, that nature refuſes to own its rival—cannot find an ample ſubſtitute in all the productions of art. In ſhort, this is what Infinite Wiſdom hath produced, as the criterion of life, throughout all nature; and I had almoſt ſaid, Infinite Beneficence hath condeſcended to inſpire an Ottoguericke, a Cuneus, a Franklin, &c. with wiſdom to invent

an artificial mean of ſupplying a deficiency of this principle agent of life, whenever, and in whatever form we can deſire. But as the diſcovery and improvements in the artificial machinery have been progreſſive, and underſtood by little and little; ſo alſo have the diſcovery and improvements in its medical qualities been progreſſive. Electricians have not been ſo completely ſkilled in electricity as they may have imagined, eſpecially in adminiſtering the ſhock. Monſtrous improprieties have generally attended, and generally defeated their hope of ſucceſs in removing diſeaſes by this ſubtile effluvia. Inſolations have been commonly ſo ſhort, that if they were uſed, even in caſes of exceſſive excitement, there could be but little harm done; and they have been ſo ſhort in all caſes, that they could be of but ſmall uſe.

Seeing, then, it has now become poſſible to reſtore nature in the very part wherein ſhe is deficient, and in which diſeaſes generally originate, by a continuation of the artificial inſolation, we have it now in our power to afford a new and ſalutary aid in ſeveral caſes of deficient excitement. This ſource of medical aid, however, involves in it conſiderable coſt and inconvenience; and it is not expected that it will be generally adopted. Thoſe who have leiſure and abilities, may uſe it to great advantage, in lingering diſeaſes, or as a preventative of diſeaſes in the hot ſeaſons, when the natural inſolation or quantity or quality of it is deficient. But I ſhall have occaſion to ſay more on this part of the ſubject, as well as of uſing the ſhock, when I come to treat of the practical rules, which I ſhall exhibit from an extenſive proceſs of experiments in the courſe of ſixteen or ſeventeen years. I ſuppoſe that it is ſo far made obvious to every judicious perſon, that great benefit may be derived from the artificial inſolation, that thoſe who have leiſure and abilities will be induced to put it to actual experiment. For the benefit of ſuch people, I will ſay ſomething of the proper means, or conſtruction of the machinery. In doing this, however, I do not mean to give a receipt for building electrical machines in particular, in this place; but only to ſhew that the machinery ought to be largely conſtructed, the wheel three or four feet in diameter, with a good cylinder—a receiver that will contain eight or ten gallons; one of this ſize will continue the inſolation a long time: every part of the metallic ſubſtances in the machinery muſt be rounded and ſmoothe, nothing pointed or edged in any part; the ſame muſt be obſerved in building the inſolating ſtand or bed; any thing edged or pointed, will throw off or diſſipate the fire, and you cannot carry the inſolation high, nor continue it but a ſhort ſpace. There muſt alſo be a fire kept in the room, to keep the air dry, otherwiſe it will fall upon the glaſſes, and prevent their charging. The perſon inſolated muſt not have pins about him

with the points ſticking out, nor any kind of pointed metal; it will likewiſe diſſipate the effluvia, and prevent their charging or retaining a charge of inſolation. Theſe are the principal things to be obſerved in order to effect a degree of inſolation that may be expected to avail any thing worth attention.

There is another method which might anſwer as good a purpoſe, or better, on ſome accounts: it would be attended with more coſt in the firſt inſtance, but with leſs trouble in the uſing. I mean to conſtruct the works in ſuch a manner that the cylinder or globe ſhould be turned by the aſſiſtance of a water-wheel. This might be done on a ſmall rivulet of water, as a very little would anſwer the purpoſe of turning the cylinder, with a good conſtruction. It would not be good to erect it nigh a mill-pond, or any large body of water, as the dampneſs and exhalations from ſtagnant waters would be injurious to the operations of the machinery, and unfavourable to the health of the patients attending.

As the intention of this conſtruction would be, in the hands of a phyſician, to treat caſes of great and obſtinate debility more effectually, one ſuch conſtruction would be ſufficient for one county. I doubt not but that a ſkillful electrician would find a mutual advantage ariſing to himſelf and to the public, in properly conſidering this new branch of the healing art. This conſtruction would anſwer all the purpoſes of thoſe that are turned by hand, both in inſolating and giving the ſhock. The phyſician would have his patients under his daily inſpection and care, to vary the operations as he ſaw proper; to adminiſter any other aiding medicines, as he might ſee needful; and to govern the regimen, but eſpecially the temperature of air; that his patients obſerve one ſteady invariable degree of warmth: this is ſomething difficult to learn. I have always obſerved that people could not readily conceive of the extreme minuteneſs of attention which it is neceſſary to obſerve, when under the operation of electricity, eſpecially the ſhock, to prevent taking cold, or checking the perſpiration: the greater part muſt learn it by actual experiment; and even then they will not ſuſpect that electrifying was the cauſe that expoſed them, unleſs they are cautioned to expect it. Whoever wiſhes for ſucceſs in adminiſtering electricity, muſt pay all attention in this particular.

Such a conſtruction, in the hands of a judicious phyſician and electrician, would ſoon become popular: its extreme uſefulneſs would court the attention of mankind, and draw increaſing numbers to it, as to an ineſtimable reſort for life and health. Thouſands that reſort to Ballſton, Saratoga, and other mineral waters, yea, and with diſeaſes of deficient excitement too, would, in proceſs of time, learn to avoid thoſe debilitating waters, (excepting what may

be neceſſary as a purgative) and reſort, for the cure of diſeaſes of debility, to this fountain of ſupernatural inſolation—this all-quickening, expanding, vibrating, animating, pervading, ſuſtaining principle of life and motion. There will be a conſiſtency in theſe means for cure of deficient excitement, viz. the inſolation to ſtimulate and promote action and velocity in the circulations; and this indication, alternated with a few gentle ſhocks, to promote attenuation and a due mixture of the ſecreted and circulating fluids, and to ſeparate and carry off the retained humours.

In ſpite of all the neglect with which the ſubject of medical electricity is treated by phyſicians, and the world of mankind in general; in ſpite of all the buffoonery and contempt, malice and oppoſition, which ſome of the faculty diſcover to a character that patronizes medical electricity, (a ſubject into which, however, they will not enquire) there are ſome European writers who have acknowledged, that electricity doth produce the above deſcribed effects on the human body. Some of theſe electricians have made conſiderable improvements, of late, in the art. It was with regret that I obſerved the lateſt and beſt of theſe writers, viz. Cavallo, to be ſo far ſhort of a thorough inveſtigation of the ſubject, as to make it neceſſary for one, whoſe abilities in other reſpects are not equal to the taſk of arranging and treating a ſubject in a learned and methodical form, to attempt a ſubject ſo occult and intricate; and, from circumſtances which have ever paſſed the obſervation of electricians, to produce the leading clew, and eſtabliſh the ſubject on its true, genuine principles. I have not attempted to be "wiſer than ſeven men that can render a reaſon:" I have demonſtrated it, to the capacity of boys, that electricity, artfully diſpenſed, is an infallible remedy of fever and inflammation; and, in producing this effect, muſt neceſſarily effect ſeveral other valuable purpoſes. I have demonſtrated the probable utility of the ſupernatural or artificial inſolation; and made it apparent, that we may reaſonably look for great relief in caſes of deficient excitement, whenever there ſhall be a reaſonable and judicious application thereof made in ſuch caſes.

I could wiſh that I might, with propriety, now drop my pen, and cloſe the ſubject; that the operator might at once infer the mode of treatment proper to fever, and all other caſes in which electricity is uſeful. But as this part of the ſubject of adminiſtering is likewiſe embarraſſed, and cannot be always readily diſcovered, it makes it neceſſary for me to take that part of the buſineſs into conſideration, and treat of the mode of adminiſtering electricity, peculiar to the ſeveral diſeaſes in which it is proper, and deſcribe that particular manner in which the diſeaſe is affected thereby, that the phyſician, or operator, may be able to judge what other means will be neceſſary to accompany electricity,

CHAPTER III.

Containing practical rules for adminiſtering medical electricity, in ſeveral caſes—formed from a proceſs of experiments.

FEVER.

IN whatever habit, or from whatever cauſe fever may originate, I ſuppoſe it will be granted, briefly, that fever doth conſiſt in tenſion and retenſion; that this is what conſtitutes fever in all and every perſon, of every age and in every clime, whether it is termed nervous, bilious, intermittent, remittent, &c. they are but terms to expreſs different circumſtances, or different manners in which the ſubject of fever is affected by tenſion and retenſion. This being granted, we will proceed to the application of the infallible remedy of tenſion and retenſion, as it reſpects ſeveral important circumſtances.

When the operator comes to his patient, he muſt inform himſelf of the peculiar circumſtances of his patient; notice the habit, ſtrength, &c. peculiar to the conſtitution. If a woman, and pregnant, all theſe circumſtances will require minute attention, and a different manner of treatment—if the fever is bilious, and the ſtomach is much exerciſed therewith, it will be neceſſary to adminiſter an emetic, prior to electricity—if coſtive, a cathartic may be given at the inſtant of commencing the electrical operations; and the ſhock will accelerate its operation. Theſe precautions being had, proceed in the firſt inſtance to take off the tenſion in the lower extremities in the firſt place, by paſſing ſhocks from about the hips to the feet obliquely, that is, from the right hip to the left foot, keeping the legs apart. If it be a ſtrong conſtitution, and not a woman pregnant, the ſhocks may be paſſed in this direction very ſtrongly, or ſo ſtrong that the patient may perceive the motion of the ſhock nearly the whole diſtance, that is, from one chain or wire to the other, or from the hips to the feet: ſix or eight ſhocks being paſſed in that direction, ſhift the chains contrariwiſe, and paſs as many down the oppoſite ſide.

This operation is performed with all ſafety, and will ſoon abate the action in the whole ſyſtem; by enlarging the diameters of the veſſels in the lower extremities, and opening the pores, the blood will incline towards this relieved part, and eaſe the head of pain, and in a little time will recover from delirium. It is very expedient to conjoin with this operation woollen or flannel cloths, dipped in hot water, and wrapped about the feet. It helps greatly to promote perſpiration; and when the ſhock is applied to the whole body, it is uſeful to dip a fire-brand in water, and, with flannel wrapped round it, apply it to the patient's back or ſides. The patient muſt alſo drink freely of ſome hot, fermenting herb tea, till a free perſpiration is induced. Wait, if you have leiſure, fifteen or twenty minutes after the firſt operation; then proceed to paſs eight or ten ſhocks from the right hand to the left, ſo ſtrongly that the patient may perceive the motion of the ſhock in the ſhoulders or above the elbows, or perhaps in the breaſt, if there ſhould be no particular weakneſs there, which is ſometimes the caſe, and might receive injury by too ſtrong a ſhock on the part. Indeed, whenever you take a new direction of the ſhocks, the firſt ſhould, in all caſes, be light; and as you increaſe their ſtrength, you muſt do it by conſulting your patient's ſenſation of the ſhock; and take care not to wound any particular part by an over-action of the ſhock, nor reduce your patient too faſt, nor too low. Alſo, trembling and faintneſs will ſometimes occur, eſpecially on the firſt electrifications: all which occurrences and circumſtances muſt be looked for and obſerved, and remedied—ſometimes by deſiſting the ſhock for a time—ſometimes by an internal ſtimulus, &c. &c.

After eight or ten are paſſed in the above direction, let twelve or fifteen be paſſed from the ſides of the neck to the bottom of the feet, of about the ſame ſtrength as the former; of which you will be able to judge by your electrometer, which I have deſcribed, (vide chap. 1, page 27—28) where it is ſaid that the diſtenſion of the balls is in proportion to the degree of the charge, &c. It is neceſſary that every operator know the quantity contained in his receiver: This is eaſily done, by obſerving the diſtenſion of the electrometer, in different degrees of it, and then experiencing the ſhock in his own body. Although your patients muſt be conſulted, as before mentioned; nevertheleſs, you will find ſome of them that will complain before they are hurt. A light ſhock will give a diſagreeable ſenſation in the joints, and ſome other parts, eſpecially where the chains are applied. Thus the operator will be obliged to uſe his own judgment ſometimes, as well as to conſult his patient's feelings, &c.

Theſe operations—this number of ſhocks, may poſſibly promote an univerſal diaphoreſis, in a degree; but, after a few hours, it may be, and generally is neceſſary to adminiſter as many more. Of this you muſt judge by the habit, by the ſtate of the pulſe, by the eaſe and quietneſs of the patient. If the perſpiration is rapid, in full flow, you may deſiſt the ſhock, and expect the ſymptoms of diſturbance to ſubſide more and more. But, at all events, if the patient can bear it, theſe operations muſt be perſiſted in, and repeated once in two or three hours, till the tenſion is taken off, and perſpiration is in full flow; and the ſhock muſt be aſſiſted by all the means before directed, or ſome others that will anſwer the purpoſe.

The time of keeping up this full flow of perſpiration muſt be longer or ſhorter, according to the fullneſs of the habit, or till all pain, reſtleſſneſs, &c. are totally extinguiſhed, and the pulſation calm and eaſy.

If there ſhould be any difficulty in removing pain from the head, a few light ſhocks, brought on to the forehead, or back part of the head, as the ſeat of the pain may be, and paſſed to the feet, will commonly give relief when the other directions will fail.

There will not always be the ſame immediate relief gained; and there will be much variation as to the number of ſhocks, as well as their ſtrength, required in various conſtitutions and degrees of the fever.

There are ſome happy conſequences attending the treatment of a fever by electricity, which are not always ſure to attend a different treatment; ſome of which are, there can no kind of ſwelling generate where the electric ſhocks have been lately paſſing; there can be no tumifactions, ulcers or abſceſſes, nor cauſe of them, remaining in the ſyſtem, or they are certainly diſcuſſed by the ſhock repeated upon them, unleſs previouſly maturated; in which caſe it is difficult, or utterly impoſſible. The moſt that can be done in ſuch a caſe, is to reſtrain the inflammation, and ſhorten the criſis of ſuppuration, &c.

Many are the diſaſters which happen to people in the progreſs of a fever, under any other treatment; all of which we may, with the greateſt certainty, expect to avoid, in treating with electricity in manner and degree ſuited to the exigency of the caſe.

In treating fever by electricity, in conſtitutions more infirm and delicate, the operations muſt be made in a milder manner and degree; the ſhocks muſt be paſſed in the ſame directions as before deſcribed; the tenſion muſt be taken off in the lower extremities firſt, (except in pregnant women, which circumſtance will require a little different treatment:) there is leſs danger of inducing diſagreeable ſenſations, ſuch as faintneſs, trembling, &c. The ſyſtem will be greatly relieved, without paſſing a ſingle ſhock upon the vital part. It is prudent to give a very weakly perſon all the relief poſſible by this firſt operation. It will ſometimes be neceſſary to adminiſter a doſe of *elix. parag.* or diluted opium; or, if you pleaſe, in ſubſtance, to keep up the vital ſtrength of the patient, after a ſhort evacuation by perſpiration.

It may be obſerved, that the weaker the conſtitution of the patient, the leſs will the tenſion of the fever reſiſt the operation of the electric ſhock. The leſſer quantity, then, will produce the ſame effect on a weak perſon, a child, &c. that a larger quantity will upon a ſound, ſtrong man. A ſhock that would ſcarcely take off any degree of tenſion in a ſtrong man, would reduce a weak man, even in a fever, greatly below par. The operator muſt, as was ſaid before, be acquainted with his own machine: He muſt obſerve the different degrees of the charge by the electrometer—muſt notice how well people are affected by them—muſt notice what degree will be felt in a well man, no higher than his wriſts, when the ſhock is paſſed from hand to hand through the breaſt—what degree by the electrometer will jar the ſame man to his elbows—what degree will affect him to his ſhoulders; and, laſtly, what degree will jar him in his breaſt.

This laſt is the higheſt degree that ſhould ever be adminiſtered: It is hardly ever neceſſary, even in the higheſt degree of tenſion, in a ſtrong man; it may as well be performed by an increaſed number of weaker ſhocks, which are much ſafer and eaſier for the patient.

I have frequently obſerved, that a ſhock which could be felt in a ſtrong man, or woman, no higher than the wriſt, would jar a weak perſon ſmartly in the breaſt, and would be almoſt the over-action of the ſhock in them.

Let the degree of the ſhock be what it may, if a perſon feels hurt in the breaſt with it, he is hurt indeed; it is the over-action of the ſhock to him. Hence we infer the abſolute neceſſity of commencing the operations in a reduced degree; and that they be increaſed, partly by conſulting the patient, eſpecially if a delicate one, and partly by the operator's abſolute judgment. In caſe of pregnancy, the ſhocks muſt notbe paſſed obliquely, but paſſed from about the hip joints to the foot on the ſame ſide, and that but lightly; the legs muſt not lie together, leſt the ſhock ſhould take a circumlocution, and paſs partly on to the oppoſite ſide and may, eſpecially in a weak perſon, endanger abortion. I think there would be much danger in paſſing ſtrong ſhocks through the uterus; they would, undoubtedly, prove fatal to a delicate habit. Light ſhocks may be paſſed in great numbers from right hand to left, acroſs the breaſt, and from the ſides of the neck to the feet; but theſe laſt muſt be almoſt imperceptible; they muſt not be perceived to jar the patient in the body. However, as there is an increaſed tenſion or ſtricture upon the veſſels, there can be no great danger in reducing that tenſion to the ſame degree of laxity which exiſted before the fever, if it is done moderately. I have had occaſion to uſe it on ſeveral women, in all ſtages of pregnancy, and have never obſerved any ill effect produced by the ſhock in ſuch caſes. I had occaſion to uſe the ſhock on a woman in the yellow fever, at New-York, the wife of Abraham Bower, Waſhington-ſtreet: ſhe was in a very high ſtate of inflammation, and of a firm, compact habit: I gave her great numbers of light ſhocks: in the courſe of two or three days, ſhe was relieved from the firſt operations of them from pain; in a few hours an univerſal diaphoreſis was promoted, and kept up about two days, by which time ſhe was nearly well. I think it was the fourth or fifth day after I took her under my care, that ſhe cooked gammon

herſelf, and ate freely, without receiving any injury thereby. This was about the laſt of September, 1798. Mrs. Bower, however, could hardly believe that thoſe little inſignificant ſhocks ſhould be ſo inſtrumental in her cure. Doctors in the city had the ſame inſtruments, and did not uſe them ſcarcely in any caſe: I was from the country, and cut no popular figure; in ſhort, the lady did not know what to think of this new faſhion, but was willing to own I had cured her very ſuddenly, and was a good nurſe.

The fever was on the decline when I came to the city, being the laſt of September, ſo that I had but a very ſmall opportunity of introducing my new and infallible remedy of fever. While I was tending on Mrs. Bower, I was called to a woman near Bear-market, I think a kinſwoman of Mrs. Bower; ſhe was ſuddenly taken of a fever (but not pregnant;) I gave her a ſmart electrification, and directed the nurſe to purſue means of promoting a deep ſweat: it was done; the next day I called to ſee her; ſhe was ſetting up, and comfortable, and was directly well. I was next called to a woman who had nurſed a man, called Cootong (but ſpelled differently) a ſhoemaker, nigh Tea-water pump, who had juſt died; ſhe was much affected in the pleura; but a ſingle electrification reſtored her, with a few other ſimples. By advice from Dr. M'Lain, I went to Bellevue hoſpital, where I relieved a few convaleſcents.

A German, called Chriſtian Pineroot, who was employed in one of the ſugar-houſes, was brought ſick of the fever, but not very bad: I adminiſtered electricity freely, and the aſſiſtant means; he was reſtored immediately: the third day, early in the morning, he abſconded the hoſpital, without any diſcharge; I returned his name to Dr. Bailey, who had not ſeen him. I uſed the ſhock on one more, a young man juſt arrived from London; he was brought to the hoſpital extremely bad, exerciſed with excrutiating pain in his head, &c. With the electric ſhock I gave him immediate relief from pain; but as I directly left the hoſpital, without purſuing it till I had ſufficiently taken off the tenſion, and induced perſpiration, I know not how it terminated with him. I have taken the liberty to make theſe few brief ſtatements of facts, that the citizens may, if they pleaſe, inform themſelves of the truth of them, in ſome inſtances, at leaſt. I ſhall now cloſe this paragraph, by obſerving that the moſt ſtrict attention muſt be paid to the patient's temperature of air, or rather an excluſion from air, from every the leaſt degree of coolneſs for a number of days after the operations of electricity are deſiſted. After a ſufficient evacuation hath been made by ſweating, the degree of heat muſt be moderately abated, but not to admit of the leaſt coolneſs; for this purpoſe a very careful nurſe muſt attend the patient in ſleeping, leſt by accident the covering be thrown

off, and the patient take cold, which would at leaſt be hurtful, if not endanger life itſelf. There is no poſſible caſe in which it is ſo difficult to guard againſt checking the perſpiration, or taking cold, as in that of electrifying till perſpiration is induced; and, indeed, without even making that perceptible, there is need of particular caution. Being thoroughly convinced that the ſucceſs of the operation depended very much on the faithful attention of the nurſe, and the difficulty of perſuading them of this truth, I have ever made it my care to obſerve their conduct in this particular; or when I could not truſt to them, and had leiſure myſelf, or when the repute of medical electricity was ſuſpended on the caſe, as in that of Mrs. Bower, I have taken the whole buſineſs on myſelf, and have generally had the beſt ſucceſs when I have ſo done. The phyſician will now underſtand that electrifying in a proper manner performs nearly every part of the cure, excepting what is performed by emetics, cathartics and tonics. Electricity ought to be uſed in the firſt ſtages of a fever; the patient is better able to bear the operation: if it is neglected in dangerous fevers, ſome part eſſential to life may be ſo impaired or wounded as never to recover by any means. It ſhould be uſed early in the yellow fever, ſuch as hath prevailed of late at New-York, Philadelphia, and ſome other places, to reduce the action of the heart and arteries, before their enginery, by preſſing too ſtrongly upon the capilaries, cauſes them to uncap and emit blood. It is in vain to adminiſter the elix vitriol, or any other aſtringent in this caſe, unleſs they could affect the capilaries only; but while they increaſe the cauſe, as much as they militate againſt the effect, to ſay no worſe of it, it is uſeleſs. But to take off the tenſion of the veſſels, this is going to the bottom of the cauſe, and there will be no emiſſion of blood in fever, or peripneumony. There is no doubt but that the attenuation of the blood by rarifaction renders the increaſed action of the arteries more capable of producing this effect. But there is no emiſſion of blood, ſimply from attenuation of that fluid. There is always ſome other cauſe co-operating, as the increaſed action of the vaſcular ſyſtem, in whole or in part, or ſome extravaſitation of the blood.

Peripneumony.

THIS inflammation of the lungs, which is local in the firſt inſtance, but becomes univerſal in its ultimate proceſs, and hath its firſt riſe in the general diatheſis, ſhould be treated by the electrical ſhock, as fever in the firſt inſtance: That is, the diatheſis ſhould be removed in the lower extremities in the firſt place. The ſthenic diatheſis being taken off in the lower extremities, by the diſtenſive dilating effect of the ſhock, and the perſpiration promoted there, will cauſe the blood to draw off from the cheſt, and relieve the action of the pulmonory veſſels, and give relief in the lungs. This caſe, as well as the ſeat of inflammatory rheumatiſm, demands a delicate treatment; the highly irritated ſtate of the lungs will not bear the moſt imperceptible elaſtic ſpring of the ſhock; indeed, the leaſt ſhock is ſo far perceptible that it apparently wounds the lungs; but there is no neceſſity of paſſing the ſhock through the lungs, until they are ſo far relieved by removing the general diatheſis, by ſhocks in every other part of the ſyſtem, that they will begin to receive light ſhocks freely; and they may be increaſed in ſtrength from time to time, without any perceptible alteration in the patient's ſenſation of them: for as the lungs are more and more relieved, the ſhock will be leſs and leſs perceptible in the lungs; which will be one criterion whereby you may judge of the degree of betterment. If the patient's habit is very ſanguine, the cure may be facilitated by bleeding: the cure, however, may be abſolutely wrought without bleeding in all caſes, and it would be an error to take any part of the vital fluids, where there is evidently a penury of fluids, whether it be in pleuriſy or peripneumony: but as there will be no neceſſity, ſince electrity is now underſtood, of letting blood, merely becauſe there was no alternative, the phyſician will not now be driven to the extremity of chooſing the leaſt of two evils, but will now only let blood when the patient can well enough ſpare it, and facilitate the cure thereby.

The ſhocks muſt be paſſed from the hips to the feet obliquely, as for fever, in the firſt inſtance; but may be increaſed in their number, or frequently repeated. In the next place, bring the chain from the hip as high as the pit of the ſtomach, and oppoſite the ſtomach on the ſides and on the back, and paſs twenty ſhocks in the ſeveral directions down to the feet; next, paſs four or five from the ſhoulder to the hand, on either ſide. Soon after theſe ſhocks are paſſed, perhaps in one hour, the patient will begin to bear them through the lungs, in which direction their ſtrength may be gradually increaſed, till the whole diſturbance is intirely removed. But it muſt be remembered that the ſame means preſcribed for fever, to aſſiſt in bringing forward a flow of perſpiration, muſt be made uſe of here, and indeed in all caſes of increaſed excitement, and kept up till the deſired effect is produced, or ſo far as can be produced by this evacuation; in peripneumony, internal evacuations are frequently neceſſary, eſpecially by cathartics; in which caſe, glauber ſalts are eſteemed proper, in the moſt of caſes.

Perhaps, by often repeating the caution, I may be heard: keep your patient from every degree of coolneſs for ſeveral days; be exceedingly careful in this particular, or all is overthrown, and you will deſtroy your patient;

not only ſo, you will ſtill keep mankind from the knowledge of its uſe, and thereby indirectly take away many lives, and leave many to languiſh in pain and miſery.

The operator, whether a phyſician or private character, will underſtand that it is expected that the electric ſhock, duly adminiſtered, will perform the principal part of the cure: a ſingle doſe of glauber ſalts may be neceſſary. If bleeding might be proper, and no phyſician can handily be had, it may be ſupplied by continuing the perſpiration a longer time, and by reducing the tenſion of the veſſels more and more, and their action will grow more moderate, till health is obtained, without letting blood.

Pleuriſy.

The ſymptoms in a pleuriſy being conſiderably different, they will require a different mode of treatment, both in the manner and degree of the electrical operations.

When the pulſe is high, with a general inflammation and a ſuppreſſed perſpiration, the ſhock muſt be paſſed in the ſame manner as for fever; but the ſhock muſt not be paſſed through the affected part of the pleura, till it hath been previouſly paſſed in all other directions. The irritated part of the pleura is to be conſidered as the lungs in a peripneumony, incapable of receiving the ſhock, till relieved by a previous operation in other parts, which, in the caſe under conſideration, includes not only the fermentation of the fluids by the ſhock, but alſo that compreſſion which is formed by a ſuppreſſed perſpiration. After all the abatement of the ſymptoms is made that can be, by fermentation in other parts, and by removing the ſuppreſſed perſpiration, let the ſhocks be paſſed directly through the affected part of the pleura, from ſide to ſide, beginning, as in peripneumony, with very ſmall ſhocks, and increaſe their ſtrength as the caſe may require, or as the patient is able to bear. It frequently happens, that the pain will move from place to place; but it may be obſerved, that it will move in the ſame direction in which you paſs the ſhock: for inſtance, ſuppoſe the ſeat of the pain to be in the right ſide, your proper method will be to paſs the ſhock from the right ſide to the left; if the pain takes a different ſeat, it will be towards the left ſide; if it moves quite into the left ſide, then turn the direction of the ſhock from the left to the right ſide; and you muſt continue to make theſe different directions, as the ſeat of the pain may be: if the pain riſes towards the ſhoulders, then turn the direction of the ſhock directly down upon it, &c.

I have given fifty ſhocks, in different directions, before the patient could move an arm, or incline the head; but by the time I had given fifty more, light ones, they have been able to riſe and walk the room, being warmly covered.

If the irritation hath remained ſome days in a particular part of the pleura, it will be ſo exceedingly weakened and wounded, that the pain will incline to that part, in preference to any other; the blood, wind, &c. will continue to diſtend, and irritate the feeble part: in this caſe, the ſhock ſhould be paſſed once in half an hour, or nearly that, as the pain may chance to increaſe in the part; this will give the dilated part temporary relief, and enable it to recover its natural tone and ſtrength in a ſhort time. But ſometimes there is a violent pleuriſy, and with it a voluntary perſpiration; or at leaſt, there will be no ſymptoms of perſpiration's being ſuppreſſed—no evidence of ſthenic diatheſis being preſent, but evidently aſthenic. In this caſe, a general fermentation of the blood is all that is neceſſary to be effected. It is owing to ſome ſtagnation of the blood, from the groſſneſs of its particles; to attenuate theſe, and throw them into circulation, is the whole indication of cure; this may be effected by electrifying throughout the whole ſyſtem, but eſpecially through the ſides, as ſtrongly as the patient can bear, without being wounded thereby. It is often neceſſary to repeat the ſhocks three or four times in one day. The oftener they are repeated, the leſs number is generally ſufficient. It is ſometimes neceſſary to adminiſter a purge, but very ſeldom an emetic. I have obſerved caſes, in which an emetic is abſolutely neceſſary; yea, death will be the conſequence of withholding an emetic : but this has its riſe in the ſtomach ; the pain commences there, by reaſon of accumulated ſharp crudities, that irritate the region of the ſtomach, and by-and-by a ſympathy ſtrikes the ſides : the doctor is called to a pleuriſy ; he lets blood, but to no eſſential purpoſe ; it muſt abate the ſympathy in the ſides, but cannot affect the cauſe. In one caſe of this deſcription, I was called ; but all means were baffled, even the electric ſhock would only abate the ſympathy in the ſides for a few minutes ; but as ſoon as a puke began to operate, the whole diſturbance ſubſided. I have known but of one other caſe juſt ſimilar : A doctor was called, at a late ſtage : he drew blood for a pleuriſy ; it availed nothing ; the perſon expired in great agony in a few hours after bleeding.

St. Anthony's Fire.

This diſeaſe is attended with a total ſuppreſſion of perſpiration, equal to any retenſion in fever heat. It may be totally cured by electrifying ; but it will be aſſiſted by purges, &c. The method of treating by electricity, is to electrify freely throughout the whole ſyſtem, as ſtrongly as the patient can well bear ; and this muſt be aſſiſted by all thoſe means preſcribed to aſſiſt in promoting a rapid flow of perſpiration in a fever ; this muſt be kept up until perfect relief is obtained.

If the head is much affected, it muſt be covered, and the ſhocks paſſed from all parts round about the head, to the feet ; this will promote perſpiration in the head alſo, it being covered warmly, and will ſoon throw off the whole affection in the head and body. The covering on the head muſt be left off by little and little, or a cold will enſue.

Inflammatory Rheumatiſm.

With ſome people, rheumatiſm, rheumatolgia, or chronic rheumatiſm and gout, all paſs for rheumatiſm : with ſuch as do not diſcriminate theſe caſes, my boaſted cure of inflammation may, and undoubtedly will, fall into diſrepute. Electricity hath, by many, been recommended in almoſt all chronic caſes, or caſes of debility, or deficient excitement ; and from its known uſefulneſs in ſuch caſes, it hath been adored by many. But to apply this elementary fire in caſes of inflammation, of increaſed action of fever heat, would be to add fire to fire, fuel to flame. It hath been ſuppoſed, that nothing in nature could be more abſurd, or more dangerous ; that it would tend directly to increaſe an inflammation ; but the contrary of all this is juſt the truth. I do not mean, however, that the electric ſhock is of no uſe in caſes of deficient excitement ; but that it is, as to ſome of the effects of deficient excitement, a direct remedy : but as to its being a ſtimulus, it is only indirectly ſuch ; and that when it is purſued to a certain degree, it is a direct debilitator; and, being ſuch, and in that very peculiar manner, before deſcribed, is a direct remedy of fever and inflammation, goes to the very bottom of the cauſe, in ſuch a manner as no other medicine on earth can poſſibly do, and removes tenſion in any degree, and reduces to any ſtate or degree of laxity, at the pleaſure of the operator, and performs all this in the hands of a judicious electrician, without the leaſt prejudice to any part of the animal ſyſtem: but, on the contrary of that, if the ſtrength of the ſhock doth not exceed due bounds, all the animal functions, eſſential to life and health, are aſſiſted; digeſtion is promoted, any retained coagulated fluids are ſeparated, and carried into the circulation; and being attenuated, and the natural evacuations promoted, the fluids become cleanſed and purified; it removes any extravaſitation that may be of the blood, any cauſe of polypus, gravel, ulcers, cancers, &c. &c.

Thus, while we are removing the moſt malignant of diſeaſes, by this innocent, powerful, and moſt bleſſed of all medicines, we have the additional ſatisfaction of knowing that we are, at the ſame time, laying a foundation for the enjoyment of perfect health in the patient.

But, as to the manner of removing the inflammation in a rheumatiſm, the generally increaſed action of the veſſels, and the ſuppreſſed perſpiration, muſt be treated by electricity

as fever; and the local affection muſt be treated as the lungs in a peripneumony: for not only the lungs in a peripneumony, but alſo any other part, highly irritated and inflamed, can hardly bear any degree of an electric ſhock. Wherefore, all the relief muſt be given that is poſſible, by taking off the increaſed action, and by inducing a rapid perſpiration, before a ſingle ſhock is paſſed through the local affection, or ſeat of the diſeaſe.

In treating the local affection (vide page 89th) the ſame precautions muſt be obſerved that you do not wound this ſeat of inflammation, that are neceſſary in commencing the operation on the lungs, in a peripneumony. Moreover, the retained morbific matter will be with more difficulty removed, ſhould theſe dilated and irritated veſſels be additionally dilated by the ſhock; the reduction of the ſwelling would be retarded, through the inaction of theſe particular portions of veſſels. For, in ſpite of all the ſtricture of fever heat, the diameters of the veſſels, in the ſeat of the affection, are diſtended, by a redundancy of morbific matter, blood, &c. Hence, the cauſe of pain ariſes from the tightneſs with which the veſſels embrace this redundancy. The pains in fever are of a ſimilar deſcription, or from ſtricture ſimply.

After the ſthenic diatheſis is removed, and the action of the veſſels reduced to a ſtate of health; the local affection may be treated by

Perkins's metalic points; they would, by a continual ſtroking, aſſiſt the veſſels in carrying off their morbid contents; although not ſo ſuddenly as the gentle ſhock. This, with much deference to Dr. Perkins's opinion, I conceive to be their chief uſe; and perhaps a pair of ſteel-pointed ſciſſors would anſwer the ſame purpoſe. Their friction may, however, remove ſpaſm, when it approaches nigh to the part affected. * In applying the ſhock to local affections, ſuppoſe in the knee, the ſhock ſhould occupy a greater ſpace than the affection of the diſeaſe; that is, in the ſuppoſed caſe, the ſhock ſhould be paſſed from about the hip through the knee, nearly or quite to the foot: if reduced ſufficiently low, they may be given in great numbers. I have given ſixty, ſeventy, eighty, to one hundred in a day, but exceedingly light. Purgatives are very

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* It is not a little aſtoniſhing, that a man of education and talents, ſhould fall into the notion, that fever and inflammation ſhould originate in an increaſed quantity of elementary fire, (for it muſt be that if any thing) imbibed in the human ſyſtem, that might be extracted by pointed inſtruments, like what may be extracted from a perſon plus electrified, on an inſolating ſtool. This appears to be Dr. Perkins's notion of fever, as is evident from his attempting to treat the yellow fever at New-York with his points. It is to be regretted that his miſtake ſhould coſt him his life; but it proves him to be ſincerely miſtaken. I doubt not, but that ſome cures were effected while ſome of theſe were operating; but theſe might be effected by the ſtimulation of the imagination; and ſuch I ſuppoſe to be the principal cauſe of cures wrought by thoſe fanciful gentlemen called animal magnetiſers.

often neceſſary in a high degree of inflammatory rheumatiſm.

Inflammatory Sore Throat.

WHEN the pulſe is high, and the perſpiration ſuppreſſed, adminiſter electricity in the ſame manner and degree as for a fever, not omitting the other diaporetics, or aſſiſting means of ſweating: if a purge is neceſſary, give it: after perſpiration is effected, and many ſhocks paſſed from ſhoulder to ſhoulder, and from under the chin to the feet, with the neck warmly covered, prepare a decoction of the inſide of white oak bark, which any body will underſtand, and let the patient drink a little at a time of it, till well: the electric ſhock will remove the inflammation, and the bark will heal the internal ſoreneſs. The electrical ſhocks, in a proper degree of warmth, will abſolutely effect the whole cure, but may be aſſiſted by as many corroborants as you can obtain. Any internal inflammation, or dilation of the lungs, by a ſuppreſſed perſpiration, may always be removed, in a little time, by the ſhocks paſſed in proper directions, and in due degrees, upon the part affected, &c.*

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* Who, that knows by what means America loſt the founder of her national greatneſs—what the diſeaſe that proved fatal to our greatly-beloved WASHINGTON—and will not feel with me, that it is almoſt too late to bleſs mankind with the knowledge of this ineſtimable mean of life and health! I ſay to myſelf, had phyſicians attended to the en-

Small Pox and Meaſles.

VOMIT, if there is too much bile, and purge as may be neceſſary: But to abate inflammation, to eaſe pain, to bring forward the eruption with freedom and eaſe (if there can be an eruption where the ſhocks are given) let the ſhocks be paſſed throughout every part of the ſyſtem, and repeated at intervals, if neceſſary, If there is danger of the eyes receiving any injury, let the head be covered, and ſhocks paſſed from head to foot, from the forehead in particular. Electricity is of infinite value, when people take it the natural way, and unprepared; it often proves fatal: but here, kind reader, is an infallible remedy in ſmall pox or meaſles; take them how you may, the electric ſhock will immediately open a ſufficient evacuation, whereby to throw off the infection, to keep down inflammation; and if you apply it in due ſeaſon, you may paſs the operation of either without the leaſt pain or danger of life. But you muſt underſtand that the temperature of air muſt be exactly contrary to what is proper when you do not electrify; that is, your whole ſafety depends on your avoiding every the leaſt coolneſs, till you are completely well.

Pregnant women have trembled, and not without reaſon, at the idea of the ſmall pox in that peculiar circumſtance; but here, good women, is your ſafety—keep warm; and about the time you begin to feel the ſymptoms, electrify juſt enough to keep down inflammation; rather let the ſhocks be light, and increaſed in number; take them in every part, but leaſt through the uterus; the fermentation will be thrown off by perſpiration; light ſhocks muſt be repeated at intervals for two or three days, till the whole infection is voided. A ſkilful phyſician ſhould conduct through the whole treatment in this caſe.

The improvements in the art of inoculating, render it very ſafe and eaſy to undergo. But when difficulty ariſes in that treatment, I adviſe any perſon to change their temperature of air peculiar to that treatment, and aſſume that ſteady degree of warmth peculiar to treating by electricity, and commence the operations without loſs of time.

The firſt I tried the experiment upon, was a ſon of mine, about nine years old; he was inoculated at Whiteſtown; I never changed his common diet, nor gave him the leaſt aid by any other means; I kept him within the houſe, and warmly covered; I electrified him once a-day, about twenty light ſhocks at a time; the conſequence was as I expected; he had not the leaſt ſymptoms of fermentation, of inflammation, of pain, nor of eruption in any degree.

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treaties of ſome good and great characters in England, who have aſſerted, from a thouſand experiments, that electricity far exceeded all medicine they ever knew, Mount Vernon might now have enjoyed her delight, and America her glory!!

The place of inciſion was a little ſcarified by its working there. They who chooſe to go through the operation of the ſmall pox or meaſles, without ſuffering any thing by the ſymptoms, by pain or by the eruption, may do it at their leiſure, by obſerving rigidly the foregoing directions. If by any unavoidable accident the patient ſhould take a cold, in this or any other caſe, it muſt be immediately removed by the ſhock, &c.

Madneſs.

WHEN madneſs is attended with a ſtrong hard pulſe, and with or without redneſs of face, there is an indication of a redundancy of blood in the head, and a compreſſion and irritation of the brain, or of thoſe nerves that proceed from the brain, or the baſis of the brain, the cerebellum medulla ſpinalas, &c. all which may take its riſe from a redundancy of blood in the head. This compreſſion and irritation on the ſeat of ſenſation, of thoſe nerves of ſuch exquiſite ſenſibility, is ſufficient to produce diſorder in the mental faculties, ſuch as madneſs or delirium.

To remove this redundancy, is to remove the direct cauſe of the diſordered mind: as to the indirect cauſe, it is of no conſequence to enquire; undoubtedly there is a combination of them, partly from the peculiarity of the preſent habit, and partly from the preſent ſtate of agitated ſpirits upon that habit; all which may form or conſtitute the indirect cauſe of the deranged mental powers.

In order to remedy the immediate cauſe of this diſordered mind, the exceſſive action of the aorta aſcendens muſt be ſuppreſſed, and that exceſſive preſſure of blood to the head muſt be thrown down: this can only be done by the action of the electric ſhock, paſſed from the ſides of the neck to the feet. And, by the way, this caſe requires as ſtrong an action of the ſhock as any caſe I know of. It is ſometimes, if not always the caſe, that when there is an over-action in the aorta aſcendens, there is a deficiency in the action of the aorta deſcendens, or at leaſt in the extremities of the arteries towards the feet; and this is more probably the caſe, when we conſider that the lower extremities are more expoſed to ſuffer abuſe from colds often, and frequent dampneſs; great exertion upon the ſolids in exerciſe, thence a ſudden tranſition to inaction, hence a cold upon the lower extremities; but ſo far from the ſeat of life, it is not noticed in producing any direct effect upon the ſyſtem. But one of the conſequences is, the aorta deſcendens is unable to receive its equal quantity of blood from the heart; hence the aſcendens muſt receive too much; the blood cannot flow freely to the extremities of the arteries downward; and hence they preſs too violently to the extremities of the arteries upwards.

But a ſtrong action of the ſhock goes to the bottom of this caſe, and reſtores an equilibrium in the circulations, and frees the head from the affection. It is not certain what number of ſhocks will be neceſſary; there may be eight or ten ſtrong ſhocks paſſed from the ſides of the neck to the feet, each day; and as many light ſhocks paſſed from the top of the head to the feet, at the ſame time. Some means muſt be had, if poſſible, to keep the perſon warm. The operations muſt be repeated till the patient is reſtored to the right uſe of his mind; the ſtrength of ſhocks may be abated from day to day, as occaſion may require. In the habit under conſideration, bleeding would give a temporary relief; but as ſoon as the veſſels were again repleniſhed with their former quantity, the ſame affection to the head would be reſumed.

I can have no idea of plethory, or too great a quantity of fluids in the ſyſtem; but that all thoſe ſymptoms which have given riſe to ſuch a doctrine, have proceeded from extravaſitation, unequal diſtribution or morbid tenſion, in whole, or in a part of the vaſcular ſyſtem.

As it is peculiar to the action of a ſtrong electric ſhock to remove tenſion, and to reſtore an equilibrium in the circulations, ſo it is peculiar to the ſhock to remove all thoſe ſymptoms on which the doctrine of plethory is founded.

But, notwithſtanding, until a mean of taking off tenſion could be found, it hath been well enough to tamper with the effect, ſince

the cauſe was either not known, or elſe could not be reached by any known means.

If the electric ſhock can be applied in the firſt ſtages of madneſs, before indirect debility takes place, it may be immediately removed; for the exciting power, ſo far as it conſiſts in the animal functions, is inſtantly abated. But the exciting power, ſo far as it exiſts in the mental faculties, whether it be horror, vexation, intenſe grief, &c. muſt have mental applications—all thoſe ſoothing, entertaining, enlivening objects and funny topics of diſcourſe, muſt be indulged in all their conceits, nor irritated by thwarting nor too much oppoſition to their ſpleeny notions.

Theſe laſt ſymptoms are conſtant attendants on inſanity in debility. When it conſiſts in indirect debility, or from what commenced in raging madneſs with a ſtrong pulſation in the firſt inſtance, it will require a greater length of time to remove it. This caſe of indirect debility, muſt be treated by electricity in the ſame manner as inſanity in direct debility, juſt now to be deſcribed.

I have found, by experience, that gentle ſhocks through every part of the ſyſtem upon the nerves, and through the ſtomach, and down the back of the head, upon the top of the head, through the brain to the feet, have aſſiſted in reſtoring a perſon to the uſe of reaſon. The caſe I have reſpect to, and my manner of treatment of the caſe, I will relate in full: It may be the moſt intelligible receipt.

The perſon was a young married woman, and lived in Milton, Saratoga county; ſhe came to me at Ballſton pool, in the ſummer of 1795, if I remember right. She was attended by her mother and ſome others; her mother was the only perſon ſhe would correſpond with; who had, in conſequence thereof, taken her to her houſe; ſhe was terrified at the ſight of her huſband, with whom ſhe had lived in perfect cordiality, until ſhe became inſane. She had a young child, in ſuckling of which ſhe was reduced to that debility that gave riſe to her inſanity; and perhaps there was ſome other corroborating cauſes, that might contribute more or leſs to confirm that degree of debility. Her child ſhe would take no notice of, nor ſuffer any perſon to come nigh her, but her mother. It was with much difficulty that her mother could prevail with her to take the moſt trifling ſuſtenance, and that muſt be done in abſence of every one but her mother.

Such was her ſituation after being attended about five months, to no good purpoſe. She was emaciated almoſt to a ſkeleton; deep dejection of ſpirits, gloomy and melancholy.

I obſerved all the decorum mentioned pag 106; uſed all the addreſs in my power to ingratiate myſelf into the number of her friends which conſiſted then of her mother only; thi I knew was previouſly neceſſary, as I coul

have no opportunity of adminiſtering to her in that ſituation. Her huſband came to the houſe—I obſerved her terror—I laid hold of this opportunity to gain upon her feelings; I would not ſuffer him to come nigh her, pretendedly ſo: It had the intended effect. To be brief, it was not long before I was able to perſuade her to take a little wine; after this, under the appearance of entertainment, we got her to the machine, when I paſſed ſome very light ſhocks in all the before mentioned directions. We regaled her with all the lively appearances in our power. The next day ſhe could be induced to ſmile; this gave me great encouragement. I alternated light ſhocks, with wine, diluted brandy, &c. and as her mind began to be caught with lively appearances, we endeavoured to furniſh all the variety that was poſſible. The conſequence ſoon was, all that gloomineſs of mind was diſpelled, and ſhe gradually aſſumed the appearance of cheerfulneſs; her digeſtion was promoted, and ſhe began to take nutricious food freely. To be ſhort, in four or five weeks ſhe was able to unite with her huſband again in keeping houſe.

I had another caſe, juſt before this, at the ſame place: It was a Mr. —— Olcox, tinman, within half a mile of the pool. Several years before I ſaw him, he had been in a delirium, and, taking the advantage of the abſence of the family in the evening, cut his throat acroſs, with a caſe knife; but ſome one coming in ſoon after, ſaw him lying on the hearth, and bleeding in this frightful manner—ran and called aſſiſtance; a doctor came ſoon, ſewed up the wound, and ſaved his life. His bleeding reſtored him for that time; but it had gradually increaſed upon him for ſome time before I ſaw him; and I was told by ſome of the family, that he was apparently more inſane at this time than before he had cut his throat. It was with difficulty that the people got him to me, for he was obſtinate, to an extreme degree, in every thing. As there was no flattering of him to any thing, they forced him to the machine, like a bullock to the ſlaughter. I obſerved his habit was firm and ſanguine, his pulſe very turbulent; I adminiſtered exceedingly heavy ſhocks upon him, in the directions which I have recommended in ſuch caſes. This being done, he returned home; the next day he came again, was apparently better, but would not own that any thing had or would do him any good; he however took the ſhocks with leſs reſiſtance, and began to ſweat freely; this he noticed himſelf, as ſomething very extraordinary, for he ſaid he had not ſweated in any degree for thirteen years; to this his friends aſſented. Theſe two turns to the machine, reſtored him at that time, and he was ſoon willing to own that I had made him, as it were, a new man. I heard of him repeatedly for three years, and he remained well.

I will mention one caſe more, ſimilar to this. The following ſummer I had moved to Galway. A young man hearing what I had done at the pool the preceding ſummer, came to me, and informed me that his father was crazy; and deſired to know if I thought I could help him. I inquired into the circumſtances: I found he had been a well, ſtrong man; that the preceding winter he had ſold a large farm, had come to Galway, and purchaſed two others adjacent, but that he had loſt, by ſome deception, a conſiderable part of his intereſt; and that this chagrinery had produced this effect upon his mind. His family had become much alarmed, and were upon the eve of chaining him; I adviſed them to watch him till they could get him to me, and take care that he did not kill himſelf, or any one elſe; for he told them that the devil ſaid he muſt kill a daughter of his. I think it was the next day they brought him forward, ſometimes in a waggon, and ſometimes out of it; ſeveral people aſſiſted, but they could not keep his clothing upon him; for he was mad indeed. By the time he was brought to the machine, which was a very coſtly one, I expected he would break it to pieces; but there being about twenty men to aſſiſt, we got the chains to him, and as I did not expect we ſhould all be able to get the ſecond ſhock upon him, I charged the machine as high as I thought he could bear, and live through; for his arteries were in the higheſt ſtate of action that ever I diſcovered: I paſſed the ſhock upon him, which almoſt knocked him to the floor. I paſſed the ſhock from the top of his head to the feet, but it ſhould have been from the ſide of his neck; it would have been eaſier to ſuſtain, and otherwiſe anſwered as good a purpoſe. He appeared ſullen after the ſhock; but we were able to repeat the ſhock with leſs difficulty than I expected: I gave ſix or ſeven more, but lighter. He went home, and was more compoſed in his mind the next day, as I was informed; but it was neceſſary to bring him again, which they did, but with leſs trouble; notwithſtanding, they could not keep ſufficient covering upon him to keep him from taking cold, which prevented his recovering ſo faſt as otherwiſe he might have done. I give him a ſecond electrification, and they took him home, and it was not long before he had the right uſe of his mind, was compoſed and well. I would have mentioned his name, but it has ſlipped my memory.

I hope that all theſe united efforts will avail to induce people to try the ſame experiments on ſuch unhappy people as may be deprived of the uſe of their reaſon by any of thoſe means which may be ſuppoſed to be curable. It may be obſerved, by the way, that thoſe three caſes that I have inſtanced, were recent ones; and that I do not expect that old caſes, or thoſe that may proceed from cauſes altogether diſſimilar to thoſe I have deſcribed, or ſimply from nervous irritation, are likely to meet with

ſo ſudden relief; but that it is expedient to try theſe means in almoſt all caſes.

Where a lengthy application of electricity is abſolutely neceſſary, there is no doubt but that there will be great difficulty in attending and treating a mad or an inſane perſon with the electric ſhock; that is, to keep them ſufficiently warm: this muſt abſolutely be done, or no good will enſue; eſpecially if the patient is in either direct or indirect debility. The ſupernatural inſolation would be of unqueſtionable uſe in caſes of debility; but it ſhould be continued in ſome caſes, perhaps, for months ſucceſſively.

In order that this operation might be properly performed, it would be neceſſary that an inſolating bed was prepared, and the inſolation, or artificial ſupply of this ethereal fire, was made by the aſſiſtance of a water-wheel, that the inſolation might be conſtant night and day, that the patient might ſleep in an inſolated bed; and if, at any time, a vertigo was induced, to paſs a few ſhocks from the hips, or from the ſides of the neck, to the feet. The inſolation may be perpetuated by a large machine, turned by hand, but it would be more fatiguing.

Ague.

In treating of this caſe, I ſhall venture to take the liberty of giving my own opinion of the cauſe and manner in which this uncommon or ſingular revolution is produced or effected in the human body.

This diſeaſe is peculiarly incident to people living in flat, low lands, where the heat is intenſe, partly by the flatneſs of the ſurface of the land, and partly from ſtill bodies of water, as by the action of light upon theſe ſmooth ſurfaces, the heat becomes intenſe, and the circumjacent air is diveſted of its elaſticity, or there is a great deficiency of the natural quantity of this expanding, dilating, vibrating, or ſtimulating element, we call ethereal fire or electricity.

It hath been abundantly proven before, that this elementary fire is the very criterion of animal life; that in proportion to the degree of the natural quantity, ſo is the degree of animal life and vigour exiſting in that quantity.

From the intenſeneſs of heat in thoſe low marſhy lands, there is a rapid exhalation of noxious vapour, diffuſed throughout the circumambient air, which is undoubtedly unfavourable to health; but this, ſimply conſidered, doth not lead us to diſcover, in any philoſophical manner, how debility ſhould originate in that ſource, even that great degree of debility that gives riſe to a fit of the ague.

But upon the other principle, it is an obvious reſult or conſequence of a deficiency of this vital ſtimulus. This will further appear, if we conſider that the revolution, as I call it, of an ague, proceeds from a deficiency of energy in

the arterial ſyſtem, in particular. There is an equal degree of debility throughout the whole vaſcular ſyſtem; but the ague originates in the deficiency or inability of the heart and arteries to propel on the blood towards the ſurface: And this languor, we may with propriety conclude, hath its ſource in a deficiency of the natural inſolation, or natural quantity of the elementary ſtimulating fire: For it is well known that an additional degree of this ſtimulus, ſupplied by art, will invigorate and ſtrengthen the circulations, and militate directly againſt an attack of the ague. Not only ſo, but the ague is never known to originate in any country of high lands, where the heat is leſs intenſe, or where the natural quantity of electricity is not rendered too deficient, by intenſe rarifaction of long continued heat.*

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* It ſhould be remembered in this place, that it hath been demonſtrated, that heat doth diveſt air of its natural quantity of ethereal fire, or electricity, or that it is highly probable, from the abſolute certainty of its producing that effect on other ſubſtances, or bodies; ſuch as glaſs, bees-wax, and ſome other bodies: which ſubſtances, by ſome unknown tranſmutation, or configuration of the electric body, are changed into the very ſubſtance, as it were, of glaſs, and conſtitutes its tranſparency, its elaſticity and brittleneſs; and is ſo made up of this very element, that no artificial quantity can be added or approach it, until the natural quantity is firſt reduced by heat; then it will receive and convey the artificial quantity as freely as water or metal. Bees-wax imbibes ſo great a natural quantity in its cold ſtate, that it is as impervious as glaſs almoſt, to the approach or paſſage of an artificial quantity; but by being heated, it is as ſuſceptible as water.

The ague commences in the following manner, viz. by reaſon of extreme laxity in the heart and arteries, they become unable to propel on the blood towards the ſurface; at this inſtant the blood recoils upon the heart, and round about the heart in the arteries, forming a kind of extraverſion of the blood; the heart and arteries in the cheſt, labour with an exceſſive redundancy, greatly diſtended and irritated, and finally highly inflamed. The ſubject of it is inſatiable with drink during this ſtage of it. But the ſurface experiences a very different ſenſation: this reflux of blood upon the ſeat of the circulation, has left the coldneſs of death upon the ſurface: this will remain until the internal heat ſhall have, by its time and degree, induced a ſufficient degree of tenſity, or ſtricture on the heart and arteries, that will enable them to propel on towards the extreme parts that exceſſive redundancy that inflamed them. As ſoon as this ſufficient tenſity is formed, the blood comes forward towards the ſurface with fever heat; and that inflammation which was firſt internal and local, now becomes external and univerſal.

This appears to be the true circumſtance of the caſe, ſo far. And it will follow, that this acquired morbid tenſion will, according to the degree of it, reſiſt another paroxyſm: if the internal heat continue long, the fit will be reſiſted a length of time, in proportion thereto; but if the internal fever heat be of ſhort duration, the reſiſtance to another paroxyſm will be proportionably ſhort. Hence the quotidian and tertian agues are more violent and of longer duration in their paroxyſms, than thoſe that occur daily; and this longer continuance determines the duration of that reſiſtance to the next paroxyſm. This acquired tenſion may, however, be loſt by ſome accident, by bodily or mental fatigue, by unuſual abſtinence from ſuitable nutriment, &c. all which may ſhorten the term of reſiſtance to the next ague. A trifling cold will infallibly induce an ague very ſuddenly, which is a circumſtance that people but little notice, and which is a very common cauſe of this diſeaſe remaining ſo long.

The cauſe of thoſe fevers continuing ſo ſhort a time, is partly owing to the brevity of the exiſting cauſe, and partly to the leſs comparative degree of tenſion on the ſurface, with that which exiſts internally. The internal energy of the arteries, forms an exertion towards the ſurface, and the reſiſtance by ſuppreſſion of perſpiration through tenſion on the ſurface, being little or nothing, a diaphoreſis is quickly induced, and the inflammation muſt ſubſide. The pores being very open at the cloſe of every paroxyſm, renders it very neceſſary that people ſhould obſerve a ſteady degree of warmth in this diſeaſe, even when they are not electrified.

Theſe ague-fits, like the epilepſy, are more eaſily prevented than remedied or removed, after they have once commenced; the ſyſtem is much weaker after the firſt paroxyſm, than before. The arteries are ſo exceſſively dilated by the redundancy of blood, that notwithſtanding their temporary ſtricture, acquired by the fever heat upon them, it is ſoon loſt; and being loſt, they are in a greater degree of laxity than before.

The uſe of the electric ſhock in removing an ague, is ſometimes very conſiderable, and often a radical cure; it is of uſe to throw off the jaundice, to regulate the ſecretions, and in fine, to prevent its terminating in a bilious fever. But this is not all; it will prevent the gradual reduction of the exiſting tenſion in the ſyſtem, by preventing the dilation of the arteries, through the redundancy of blood in this unnatural reflux upon them.

That this operation may be made properly, the ſhocks muſt be paſſed through every part of the ſyſtem, but eſpecially through the cheſt; and this muſt be done at the inſtant, or if you can gueſs the time, a few minutes before the ſenſation of cold commences: theſe ſhocks muſt be repeated until the ſenſation of cold ſubſides: the intention of the ſhocks is to ſtimulate, or impart elaſtic ſprings upon the arteries, thereby to enable them to perpetuate the free flow of blood towards the ſurface, which they will do, and reſtore a ſenſation of warmth

in conſequence thereof: in performing this, the arteries are ſecured from that redundancy which ultimately diminiſhes their exiſting tenſity; and the patient is relieved from much pain and diſtreſs, even when the fits are not intirely removed thereby. But by performing this operation, at the proper time, as above mentioned, for two or three ſeveral paroxyſms, they will frequently cure; and if not, they will greatly relieve the patient. The ſhocks muſt be paſſed from the right hand to the left, from the ſides of the neck to the feet, and from the back to the feet: laſtly, paſs a few from the forehead to the feet, if there ſhould be any pain in the head.

By this time it muſt be underſtood, that the ſhocks muſt be light, as this is well known to be a caſe of very great laxity. The minuteſt care is abſolutely neceſſary, that the patient obſerve a ſteady degree of warmth; the moſt trifling variation, or the leaſt degree of coolneſs, but for a minute, will induce a fit of the ague, in this critical ſituation; ſo alſo will a little mental or bodily exerciſe, or food that is not eaſily digeſted; all theſe things muſt be obſerved by the perſon who wiſhes to be reſtored in a ſhort time. It ſhould be remembered, that if by any inattention or careleſſneſs, a fit is induced, the conſequence will be, that the cure is unavoidably procraſtinated ſeveral days. Hence from a number of theſe cauſes, it has happened that phyſicians have ſo frequently failed of giving relief in this diſeaſe. Although they have not generally had the beſt means, yet they have been poſſeſſed of ſuch as would very often cure in this caſe, and the caſes would have been more frequent, had not the patients been wanting in themſelves.

The ſupernatural inſolation is of importance in this caſe; a high degree of inſolation, if commenced an hour before the fit, will reſiſt the paroxyſm conſiderably, or totally prevent it: this, however, depends on the degree of the inſolation; if it is very high, it is impoſſible that the ague ſhould commence; but a weak degree of it, conjoined with a few light ſhocks, and a ſmall doſe of opium, diluted or in ſubſtance, will, unleſs a miracle prevent it, reſiſt the fit to all intents. This is the mode of treatment which I ſhall recommend: uſe all the artificial inſolation that is poſſible, from day to day; and about an hour previous to the paroxyſm, ſtimulate and raiſe the tone of the veſſels, by that miſtaken old ſedative, opium: if the ſenſe of cold, or as oft as the ſenſe of cold ſhall appear, aſſiſt the action of the arteries, by a few light elaſtic ſprings; theſe ſhocks will alſo attenuate the blood, and facilitate it to the tone of the veſſels. If a puke is neceſſary, give it, or any other evacuant.

St. Vitus's Dance.

THIS involuntary motion is eaſily cured by the gentle electrification, daily adminiſtered,

and by repeated inſolations. Let light ſhocks, to the amount of twelve or fifteen, be daily paſſed upon the whole nervous ſyſtem. I have had but one caſe of this kind; it was a young girl, niece of Mr. Merrill, Ballſton pool; ſhe had been ſeveral months in this ſituation. It was with difficulty that ſhe could articulate ſo as to be underſtood, or aſcend or deſcend a flight of ſtairs, &c. ſhe had been under the care of one or two phyſicians; but by ſome means, received no perceptible benefit.

The method I purſued, was to give her about fifteen light ſhocks in every part of the body and limbs, in the evening; then put her into a warm bed, and gave her freely of ſome diaphoretic herb-tea, the more readily to produce a ſweat. She was kept in a gentle perſpiration three or four nights ſucceſſively; but in half that time ſhe was evidently better, and in about ten or twelve days was intirely well.

This girl had ſymptoms of a cachexy of the fluids, by corroſive tetters on the ſurface; this cauſed me to conjecture, that this involuntary motion proceeded not ſo much from debility, ſimply conſidered, as from thoſe ſharp humours, as I conceived, to prick and irritate the nerves, and cauſe them to ſpring and move, without the volition of the will. And in the ſequel I was confirmed in my opinion: the recovery was too ſudden to admit the idea, that the cauſe was debility; but it was not too ſudden to admit of the idea of its proceeding from an irritation of the nerves, by the action of a vitiated ſtate of the humours upon them. It was familiar to me, that no means on earth were able to cleanſe the human body of a cachexy, or purge the blood of vitiated humours ſo ſuddenly and effectually as that of electrifying freely, and this ſucceeded by deep ſweats. I formed my proceſs accordingly, and it had the deſired and intended effect; and purging off the humours, was the cure of the involuntary motion of the nervous ſyſtem. I inſolated the girl two or three times only, and this was not continued half an hour at a time; ſo that the cure could not be founded on the action of ſo ſhort a ſtimulus: moreover, ſhe was not inſolated until after ſhe had received ſome degree of betterment. The moſt of people exerciſed with this complaint, are in habits of debility. This was my reaſon for recommending it, to corroborate with the ſhock.

Hyſterics.

THE ſpaſm that attends this diſeaſe being a ſecondary effect, ariſing, undoubtedly, from compreſſion and preſſure—the whole affection the preſſure to the ſtomach, head, &c.—all will immediately ſubſide, by paſſing the ſhocks, in due number and force, from the ſides of the neck to the feet. This compreſſion and preſſure is ſuddenly counteracted by the depreſſion of the electrical ſhock upon the part affected. I have ſeldom had occaſion to give more than twenty ſhocks, and moſtly light ones, to remove one of thoſe rude fits. I have uſed the ſhock in this manner, I think, in hundreds of caſes; and have ever found it to have one uniform effect, ſuch as above deſcribed. The effect of removing a paroxyſm by the ſhocks has been, that when women have been careful not to take a cold immediately upon the ſhock, they have been leſs ſubject to the paroxyſm for a longer time, than when they were removed by other means. Electrifying from the hips to the feet only, would be ſufficient to prevent a paroxyſm, would women be careful to keep their feet warm.

Doctor Graham, of London, who uſed medical electricity a conſiderable time, and found it to be ſo exceedingly uſeful to women, in diſeaſes peculiar to themſelves, hath ſaid that women may, with propriety, adore electricity.

There is a certain effect produced by the electric ſhock, which I have ſcarcely noticed as yet, and which may as properly be introduced here as any other place, inaſmuch as this ſingular effect is concerned in the cure of the diſeaſe now under conſideration.—The effect I have reference to, is what cauſed Doctor Franklin to ſay, that the ſhock determined the blood, one way or the other, according as the ſhock was directed. Dr. Cavallo, a late Britiſh writer upon medical electricity, hath, barely, contradicted Franklin's aſſertion. I think Doctor Cavallo had better been ſilent on this ſubject: for there is an effect produced by the ſhock, which doth, in ſome reſpects, cauſe the blood, but particularly certain affections, to move in the ſame direction as the ſhock: and to know this, is of great importance in the cure of ſeveral diſeaſes. But it appears totally to have eſcaped the obſervation of Cavallo. Indeed, the whole ſyſtem of principles hath eſcaped, not only Cavallo, but all other writers on the ſubject.

From ſeveral obſervations, which I have made in many thouſands of experiments, I will endeavour to define this phenomenon, in the effects produced by the ſhocks on the human body. It hath, at leaſt, been hinted, that the ſhock doth determine the courſe of blood, in ſome degree: this was neceſſarily ſuppoſed to be one effect produced, otherwiſe it could not remove a redundancy of blood from the head. It is ſuppoſed to effect the removal of ſtagnant fluids, wind, &c. in the ſame direction with the ſhock, as is frequently the caſe, (vide *Pleuriſy*, page 111.) It is ſuppoſed to determine the courſe of removal of certain affections; as, in the particular caſe now under conſideration, it is ſuppoſed to effect the depreſſion of the hyſterics. That it doth produce theſe effects, is inconteſtibly true, and may be demonſtrated, in every occaſion that preſents itſelf. Shocks paſſed from the upper extremities to the feet, cauſe the blood to flow more freely towards the feet, and induce warmth in the feet. Moreover, I have obſerved, that when

I have electrified parts that have been badly bruiſed, the coagulated blood not only tends immediately towards the ſurface, in a very viſible manner; but I have noticed, that it would diffuſe through the muſcles, from the part affected, in the ſame direction in which the ſhocks were paſſed.*

One obſervation more, and which I think will determine in favour of Doctor Franklin's opinion, and will be concluſively againſt Cavallo's; and that is, let any perſon, of a ſanguine habit, paſs a few ſhocks from his feet to the crown of his head: it will generally, or invariably produce redneſs of face, ſometimes vertigo, and there will be a ſenſation of an increaſed bulkineſs of the head.

A certain phyſician, who had juſt purchaſed a machine of me, by ſome miſtake took the ſhock aſcendingly to the head, for the toothache: It gave him all the above mentioned ſenſations, except vertigo; but it cured his toothache.

From the above cited occurrences and obſervations, it is demonſtrably true, that the electric ſhock, when paſſed upon certain affections, doth determine the courſe of their removal;

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* If the electric ſhock will ſeparate ſuch a coagulation, and, what is ſtill more beneficial, throw it towards the ſurface; what ſhall we think of phyſicians who have remonſtrated againſt paſſing the ſhock upon a body of humours, leſt they ſhould fall upon ſome vital part, and prove fatal, perhaps, to life, &c.

and that it tends alſo to propel humours towards the ſurface of the body; and that, conſequently, the patient doth void them by perſpiration. And it is equally true, that when the ſhock is paſſed upon a ſet of veſſels, but eſpecially the arteries leading to any particular part, and the ſhock paſſing in conformity to the motion of the arteries, it doth aſſiſt them in forming a redundancy in that part to which the arteries lead, the ſhock being in due force.

From all that hath been ſaid on the ſubject, may be learned theſe two things: Firſt, That in order to affect diſeaſes in a proper manner, there ſhould be a judicious attention to the direction of the ſhock; and, ſecondly, That as there hath been no knowledge of this particular matter, nor indeed of any thing founded on rational principle, reſpecting medical electricity, it is no very great marvel that it is in no higher eſtimation among the generality of mankind. Any man may uſe a machine; but he muſt be well inſtructed, that doth it properly.

Epilepſy.

THIS diſeaſe may ſometimes be cured, but may always be relieved, by electrifying. If you can know by the ſymptoms, at any time, when the fit is coming on, you may prevent it for that time, by giving a few ſhocks. It will alſo throw off the ſpaſm, and bring any perſon out of a paroxyſm immediately, by paſſing a few ſhocks

from hand to hand, through the breaſt, and from the ſides of the neck, and from the top of the head, to the feet.

I ſuppoſe there are ſeveral cauſes of epilepſy, and that it is difficult to trace them with preciſion. It is, at leaſt, a very obſtinate diſeaſe, and ſometimes baffles all medical ſkill. It is found, however, by experience, that the gentle electrifications go the fartheſt in relieving perſons who are ſo unhappy as to be ſubject to it. Thoſe caſes which I have radically cured by the electric ſhock, were ſuch as I had reaſon to apprehend proceeded from ſome diſorder in the head—perhaps compreſſion of the brain, from ſome cauſe or other, or ſome part eſſential to life and health contiguous thereto. The evidences were, a great degree of ſtupor, and loſs of memory: The more theſe ſymptoms appear, the more hope there is of a cure by the electric ſhock. If the cauſe appears, from theſe ſymptoms, to exiſt in the head, the ſhock may be paſſed from the top of it only, to the feet. If there is evidently a redundancy in the head, it will be expedient to paſs ſome ſtrong ſhocks from the ſides of the neck to the feet.

There is a general utility in electrifying for all kinds of fits: even when you cannot totally cure them, they are always made leſs frequent, and generally ſhorter and lighter; not only ſo, but it will forever prevent ſtupor, loſs of memory, &c.—will preſerve the mental faculties—inſomuch, that there is as little danger of their being impaired by the fits, as there is by the moſt trifling diſeaſe. I have experienced this bleſſed effect of the ſhocks, without any exception, in about one hundred caſes: The ſtupid have aſſumed their former vivacity and cheerfulneſs, and have been reſtored to the full poſſeſſion of their former mental abilities. Theſe effects are produced by paſſing the ſhock from the head to the feet. If the fits cannot be finally cured, it will be neceſſary to electrify in this manner: to paſs two or three ſhocks at leaſt, from the forehead to the feet, as oft as every ſecond, third, or perhaps fourth fit, in order to preſerve the mental faculties. It will be eaſy to judge from obſervation of the patient, at what time it will be neceſſary to electrify.

When it is apparent, that general debility hath a part, at leaſt, in conſtituting the paroxyſm, I think it would be expedient to accompany the gentle ſhock with a high and conſtant inſolation. Depend not on inſolating for an hour or two hours in a day; but let it be continued for months, if neceſſary: there can be no ſatisfactory judgment made of the ultimate benefit of the ſupernatural or artificial inſolation, in ſuch obſtinate caſes, or any caſe of great debility, unleſs the inſolation be continued for a long time; and to effect this purpoſe, a large conſtruction will be neceſſary, and the beſt of all, would be ſuch an one as I have recommended (vide page 93, chap. 2d.) to

be turned by the aſſiſtance of a water-wheel. The action of this invaluable principle of life, continued a lengthy time, muſt produce very valuable effects,in caſes of deficient excitement: and as it is taught by ſome notable writers, that epilepſy originates in debility, at leaſt ſometimes, I think it will be highly expedient to try the utmoſt of the artificial inſolation, in theſe obſtinate caſes of epilepſy. Under a proceſs or treatment by inſolation, I do not adviſe to adminiſter the ſhock, unleſs the ſymptoms of paroxyſm may be diſcovered; or when there is no apparent admonition to be obſerved, and the fits are nearly periodical; then to electrify as before deſcribed, beginning the operation, as nigh as may be, two or three days previous to the paroxyſm; and give about twelve or fifteen light ſhocks, in the ſeveral directions before named, but let the laſt ſhocks be always given from head to feet. This number of ſhocks, or perhaps one half this number in ſome caſes, may be given daily, until the uſual period of the fit is paſſed two or three days, or longer. But the paroxyſm ſhould be conſtantly looked for, and the patient conſtantly obſerved, and the apparatus at hand; that if the ſymptoms cannot be obſerved, yet that the fit may be inſtantly removed by a few light ſhocks. I have obſerved, that when the ſhocks through the breaſt from hand to hand, would not inſtantly recover a perſon from the ſpaſm; I have paſſed the ſhock from the forehead or top of the head to the feet, and they have immediately recovered their ſenſes. This circumſtance of the ſhock through the brain, being ſo very efficacious in giving relief in the epilepſy, has led me to ſuſpect that the fit proceeds more from the brain, or the heads of the nerves in the medullary ſubſtance of the brain, than hath been generally ſuſpected: the ſpaſm, however, doth commonly, or always commence firſt in the head. I have ſeen perſons, in the commencement of the paroxyſm, ſtanding upon their feet, their eyes drawn erect, their bodies turning ſwiftly round, until they fell by the univerſal ſpaſm. Admitting that the epilepſy proceeds from ſome defect in the ſeat of ſenſation and the ſource of volition, it is no wonder that the electric ſhock has ſuch an aſcendency over any other means that can be found; ſeeing it is the only means that can act directly upon the brain and ſeat of the nerves: but as there is ſuch an intimacy of ſenſation and ſympathy between the brain and the nerves proceeding from the brain, that it is difficult to determine whether the defect is local in the head, or univerſal upon the nerves. I have inſerted theſe remarks and obſervations that thoſe who have abilities may judge of their value, if they have any.

Decoctions of valerian root, alternated with opiates, are ſometimes beneficial. The patient muſt keep warm; one ſlight cold will bring on a paroxyſm.

Cramp in the legs, or any other part, is always relieved for a time by taking a few light ſhocks upon the part affected: if the part is kept warm, it will keep the cramp off a long time; but if you wet your feet, or let the part be cold, the cramp will return immediately.

Conſumption.

SEVERAL European electricians have recommended gentle ſhocks in a conſumption. I ſaw a German doctor who ſaid he could always cure a hectic fever by electrifying. But the proceſs by electricity is attended with no ſmall difficulty: this will conſiſt in the temperature of air; there muſt be a degree of warmth, or the patient will take cold, and there can no cure be made: they muſt not be too warm, or they will be emaciated to death, by perſpiration: in ſhort, there muſt be no variation of a ſteady degree of warmth: let this be firſt determined upon; then proceed to electrify through the vitals, but very lightly: do not ſuffer a ſhock that will weaken the patient, by dilating the veſſels; they muſt be obſtinately light. On the firſt electrification there may be twenty ſhocks given; but ſome of the laſt may be paſſed from the forehead to the feet, that the head may be free from pain and dizzineſs. For three or four the firſt days, the patient may receive nearly this number of ſhocks; but the number may, and muſt be reduced: it will by no means be neceſſary to continue an equal number daily, or on the days of electrifying, through the whole proceſs of treatment by electricity. Suppoſe the conſumption to be on the liver; ſuppoſe it ulcerated, tumified and inflamed; the firſt ſhocks will attenuate the humours, ſeparate the coagulations, or cauſe purulent matter to be diſcharged. The ſtagnated maſs of humours in the liver will be broken up, and the inflammation or hectic fever will ſubſide; for this fever is conſtituted through the irritation of a part, and its beginning is purely local. Wherefore, after the body of tumefaction is removed, in general, the electrifications may be leſs frequent, repeated once in two days, or elſe four or five light ſhocks in a day : but this muſt be partly diſcretionary ; if the perſon feels eaſier, if the cough is lighter, and raiſe quicker and more freely, and eſpecially if the patient is very weak, forbear all the ſhocks that are poſſible ; be careful not to induce any unneceſſary debility. But the ſhocks muſt be repeated ſo oft as to cauſe the patient to raiſe eaſy and freely ; after the ſhocks, give a doſe of elixir paregoric, to ſtimulate the vitals, and enable them to throw off their morbid contents ; this may be repeated once or twice a day. There is another excellent remedy, either for cough, conſumption or jaundice ; I learned it of an Indian, who was famous in the knowledge of roots and herbs, the productions of America : that is, the bark of bay-berry root, a certain

herb—looks much like a blue-berry buſh, and produces a berry of which people frequently make a tallow, called bay-berry tallow. I have never known it to grow more than ſixty miles from ſalt-water. The firſt time I uſed this remedy, was in a conſumption on the liver: it directly facilitated raiſing, when the perſon coughed ; and the perſon had a ſenſation of prickling, as he ſaid, to the ends of his fingers : the uſe of it was continued about fourteen days, and the perſon got well. A French doctor, who had viſited him ſeveral times, was knowing to my manner of treatment ; he turned to an author, written in French, in which the tallow of this buſh was recommended: but it was our joint opinion, that a decoction of the root bark was much better.

The roots being dug and waſhed clean, ſcrape off the bark ; about a ſingle handful may be put to a quart of water, and ſimmered over a fire till the ſubſtance is pretty well extracted, which will require an hour ; let the patient take a large table ſpoonful twice a day, upon an empty ſtomach ; but even ſome adults cannot bear quite ſo much, and ſome can take more, and not offend their ſtomachs ; this muſt be continued, but in leſſer quantities, till well. With this innocent and powerful mean, conjoin alſo the ſupernatural inſolation, to keep up and invigorate the ſyſtem : let inſolation be as conſtant as poſſible : if this is continued highly, there will be leſs need of the elixir paregoric to be taken; it will anſwer nearly the ſame purpoſe.

Very few caſes of conſumption will fail of a cure by the gentle ſhocks; but when this decoction of the bark and the artificial inſolation are conjoined, the caſes that will reſiſt them all, will be very ſingular and few.

The excellent uſefulneſs of the ſhock, may be learned from the effect it produceth on external ſores, and tumefactions and ulcers: the ſhocks being daily paſſed through the moſt malignant ulcer, will directly diſcharge the whole matter, clarify the humours, and cauſe the parts to contact and heal; no means on earth will heal an ulcer in twice the time that the ſhocks require; and indeed it will heal ulcers and ſores, that no other means could be found to heal. Seeing, then, that this remedy is as eaſily applied to the liver, lungs, or any vital or internal part, as it is to a ſore or inflamed leg, which it will always heal, who can ſhew any reaſon why it will not produce the ſame effect internally? He that will diſpute it muſt be a novice, or elſe wiſh to blind men's eyes. To ſpeak plain Engliſh, there are remedies enough for external ulcers, tumefactions, &c. and the ancients attempted to heal both external and internal by nearly the ſame means; but both ancient and modern practice have failed in the internal part: but thanks be to God, we have now a divine medicine, and divinely pure in its nature; it reaches to the receſſes of the heart, to every internal part, producing all thoſe effects that were wanting in other means; juſt ſuch as were neceſſary to conſummate the medical art, and enable us to triumph over diſeaſes. He muſt be purblind that cannot ſee, that if there are any caſes of conſumption which are paſt cure by electricity, that it is impoſſible, in the nature of things, that a conſumption, tumefaction or ulcer ſhould form, either internally or externally, while the diſcutiency of the electric ſhocks are paſſing upon the fluids: How think ye that polypuſes, ulcers, aneuriſms or oſſifications can form in the arteries, where the electrical ſhocks are frequently acting upon them?

If theſe means fail of curing a conſumption, it muſt be in the laſt ſtages of it, or through want of a careful and judicious attention to the temperature of air, or mode of treatment. It is ardently wiſhed, by a friend to man, that theſe new and excellent means of health may ſoon become ſo general, that dangerous diſeaſes may not be ſuffered to proceed ſo far, as to render their cure doubtful.

Palſy.

I NEED not ſay much to convince people of the propriety of uſing the electrical ſhock for this diſeaſe; it is very generally known to be the beſt mean of reſtoring paralytic caſes of any thing yet diſcovered. Notwithſtanding, as there hath been much impropriety in the manner of treating theſe caſes by electricity, it will be neceſſary to be very particular in deſcribing the regular mode of treatment. For many years after the diſcovery of electricity, or after the art of giving an electric ſhock upon the human body was rendered practicable, and attempts were begun to be made to reſtore diſeaſes by the ſhock, it was one univerſal error to electrify too very ſtrongly ; the conſequence was, that ſome diſeaſes, the palſy in particular, would be conſiderably reſtored ; but by continuing the ſhocks too ſtrongly, there would be, firſt a ceſſation of betterment, and ſometimes a total relapſe into their former ſtate ; but this laſt circumſtance muſt have been owing to another miſtake, which was as univerſal and as detrimental as the former, viz. a total neglect of a ſteady warmth, which ſhould have been conſtantly obſerved. But Dr. Cavallo, a gentleman of the Royal Society in London, in his treatiſe upon medical electricity, hath, with much accuracy, detected the error of ſtrong ſhocks ; and his writings have gone not a little way in recommending to mankind a more candid attention to the ſubject of medical electricity.

A partial palſy hardly ever fails of a ſpeedy cure, by giving thirty or forty light ſhocks in the courſe of each day : ſeveral ſuch caſes I have reſtored in fifteen, twenty or thirty days. It is more difficult to reſtore the loſs of motion,

than, that of ſenſation : the loſs of ſenſation is reſtored very generally in a few days ; about one ſhock in a hundred, ſhould be ſo ſtrong as to be perceptible to the patient, the whole diſtance of the paralytic part. If the tongue is defective, let a cork or piece of ſoft wood be held between the patient's teeth, and let one wire be held to the back of the neck, and the tongue being put forward of the teeth, lay the other wire to the end of the tongue ; then you are ready to paſs the ſhocks : (the cork will prevent the patients biting their tongues when the ſhock is given) you may give fifteen light ſhocks on the tongue, in one day ; and by the way, the tongue is ſooner reſtored than any other part, as I have often experienced.

When the palſy is total, there will be much patience required to effect a cure ; the ſhorteſt term cannot be leſs than three months, and frequently twice that time will be ſpent in effecting a complete cure ; this, however, is a calculation made from obſerving the degrees of betterment acquired during the ſeveral periods in which I have attended upon ſuch caſes ; two of them only exceeded one month that I continued the ſhock, and one of theſe two caſes was totally cured in the courſe of a ſummer ; but the other was only partially reſtored, in the courſe of three months, or nearly that time : but what I mean to notice, is this, that the longer the electrification was continued, the greater the degree of betterment ; but caſes varied very much in gaining betterment. From all which circumſtances, I have made the calculations reſpecting the time that probably will be occupied in the various caſes of palſy. This I thought expedient to be noticed, leſt people ſhould too eaſily deſpair of a cure. It may be obſerved, that the recovery of voluntary motion, will be perceived firſt in the part where the nerves ſpring, or take their riſe, and will gradually proceed to the extremities of the ſame nerves; this will lead the operator to underſtand, that the ſhocks muſt be paſſed from the origin of the nerves, in any particular part, to their termination.

The method of electrifying for the palſy, which I have found to be the beſt, after trying all methods, is to give, on the paralytic part, about thirty or forty light ſhocks daily, but about every hundredth with an encreaſed force, ſo as to be perceptibly felt by the patient throughout a paralytic limb, &c.

There is another method of uſing electricity in this caſe, which, for want of opportunity ſince I conceived of it, I have never experienced in this caſe. It is well known that bliſtering has often proved uſeful in a palſy; and this being effected merely by irritation, it is more than probable that the irritation of drawing the electric ſpark would alſo prove beneficial: furthermore, if the irritation of bliſtering is ſometimes, and perhaps always, more or leſs beneficial, how much more beneficial may the extraction of the electric ſpark prove? eſpecially, when we conſider that the extraction of the ſpark may be repeated, and in ſuch numbers, continually, on every part of a paralytic limb, &c. as to excite ten times the degree of irritation that can be effected by bliſtering; the extraction of the ſpark will alſo be attended with leſs ſuffering, or rather no ſuffering to the patient. I cannot but feel a regret, that this idea had never ſtruck my mind, until it is too late to give demonſtrative examples of its uſe in this treatiſe. But it is ſo ſelf-evidently calculated to be beneficial in a palſy, that I think the judicious electrician will want no further arguments to induce him to put in execution a thorough experiment. In order to determine its effect accurately, it will be neceſſary to try the operation for a month, at leaſt, without conjoining any other means.

The manner of operating will be, to cover the paralytic part with one or two thickneſſes of flannel, and draw the ſpark through them; but muſt not draw too many exactly in one place, otherwiſe it will inflame and bliſter the part. By drawing great numbers of ſtrong ſparks from a wen, you may inflame and ſuppurate it, and any other ſwelling of the kind: wherefore there muſt be a continual varying of the place whence the ſpark is extracted, unleſs it is intended to promote inflammation and ſuppuration.

When I have uſed the gentle ſhocks upon a palſy, I have never been able to diſcover that any of the common celebrated ſpecifics, when conjoined with the electrification, were of any uſe in accelerating the cure: I have ſeveral times conjoined a preparation of *Spi. Vini. Camp. Vol. Spi. c. c.* and applied this compound as hot as the patient could bear; in which ſtate, the muſcle will abſorb a ſtream nearly as big as a large knitting-needle; but it is ſomething probable, that the diffuſability of the ſhocks, operating diaphoretically, propels the ſtimulus abſorpt in the muſcle towards the ſurface, and it flies off in perſpiration prematurely.

Dropſy.

FROM all that hath been advanced on the ſubject of medical electricity, I expect my reader will almoſt prevent me from ſaying any thing in recommendation of electricity in a dropſy, by ſaying it is already preſuppoſed; and in every point of view, in which the effects of the electric ſhocks have been conſidered, we know it muſt neceſſarily affect a dropſy in a moſt agreeable manner. I do not mean to inſinuate that your abilities are not ſufficient to diſcern a thing ſo obvious to the weakeſt capacity; but it may be neceſſary, notwithſtanding, to familiarize the ſubject by conſidering ſeveral particulars that reſpect a judicious treatment of the different caſes of dropſy.

Anaſarſa.—This is a dropſy on the ſurface of the body, an effuſion of water ſecreted from the blood and retained under the porous ſyſtem, but cannot be voided by perſpiration without the aſſiſtance of art. This is always curable by the ſhocks only: the method I have taken is, to give the patients as many ſhocks in a day as they could conveniently bear; and three or four nights in a week, have given them profuſe ſweatings. In order to ſtimulate the arteries, and propel on the perſpiration, I have given brandy with water very freely for conſtant drink. The effuſion will perſpire exceedingly faſt, and you will diſcover it in the reduction of the ſwelling after the firſt night's ſweat. Great care muſt be had in this, as well as all other caſes of electrifying, that the patient is kept ſteadily ſecured from coolneſs, night and day.

Aſcites.—This is an effuſion of water ſecreted in the abdomen. I have uſed electricity but in two of theſe caſes, one of which was a woman: I electrified her but twice; I heard ſhe was a little relieved. The other was a man, viz. ——— Robinſon, Eſq. of Chatham, county of Columbia. For ſome time before I ſaw him, the ſwelling had increaſed upon him very much, and all means that formerly had given relief now failed; he applied to electricity, in this extremity, for relief; in five days he was a good deal better, inſomuch that a veſt, juſt made, larger than uſual, and which he had ſuddenly grown too large for, was ſeveral inches larger than was neceſſary to button round. He had been very much troubled with a ſingular diſorder, in a part being inflamed with tetters, and finally produced an effect to prevent the poſſibility of voiding urine, by turns, without the aſſiſtance of the lancet: But this whole affection ſubſided in four or five days after the firſt electrification; he was able in a ſhort ſpace of time to proceed on a lengthy journey.

I will mention one caſe; it may reflect ſome light. A gentleman called on me at Ballſton pool; he was troubled with a rigidity on the whole nervous ſyſtem; he could move all his limbs a little, but they were ſtiff. I gave him ſixty ſtrong ſhocks, paſſing them on all parts; he tarried two hours, and was aſtoniſhed to find, that after uſing many means, and all to no purpoſe, with great coſt, he was now reſtored in two hours, with two ſhillings coſt. He called to ſee me about twenty days after, and aſked me if I thought that the ſhocks had any tendency to remove a dropſy: he ſaid he had grown weary, not only of uſing means for help, but of even mentioning a complaint which had troubled him for years, and refuſed any kind of help from all means that had been preſcribed by phyſicians. In a few hours after he left me, he ſaid, he began to make water exceſſively; I think he ſaid he made nearly a gallon in a few hours, and as the water was voided his old complaint grew leſs and leſs, and by the time the profuſion of urine ſubſided, he was entirely well of his old diſorder; the ſenſation of which, as he ſaid, was a heavy load lodged in his bowels, as you might conceive of a cannon-ſhot; before, he knew not what to call it, but now he knew it was the dropſy. In what part this effuſion was ſecreted I know not; or whether it was voided by ſome re-abſorbency, or whether that is poſſible I know not. It puts me in mind of what I once read in Doctor Weſley's primitive phyſic, viz. "Electrifying cures dropſies, ſuppoſed incurable." What I have mentioned are the ſummary of my experiments in the internal dropſies.

It is my opinion that the readieſt method of removing a dropſy in the abdomen, would be to extract the effuſion by the catheter, and after this is done then you may electrify, merely as a preventative; and I think no one will diſpute the expediency of ſuch a treatment, nor have the leaſt doubt of preventing a ſecond effuſion. I will affirm, that if a reſtoration of all the whole round of ſecretions, and all the various fluids, being duly prepared by attenuation, &c. is ſufficient to prevent an unnatural effuſion or ſecretion in the abdomen or any where elſe, it ſhall be prevented; but if the patients cannot ſubmit to this operation, they may moſt certainly be relieved in a good degree, if not totally cured, by electricity.—The method I have purſued in this caſe, is ſimilar with the other; only I have given a greater number of ſhocks through the abdomen than any other part, but did not neglect to paſs more or leſs ſhocks in all parts, eſpecially on ſeveral of the firſt days of electrifying.

In electrifying for the dropſy, I have generally given from forty to one hundred light ſhocks in one day; but after five or ſix days, have reduced the number gradually. But it muſt be remembered, that in all caſes of electrifying, the age and ſtrength of the patient muſt be conſulted; and further, that in all my preſcriptions, I have had invariable reſpect to adults.

N. B. I reſtored three of the anaſarſa at Ballſton pool, while they continued the uſe of the water internally, and it proved a great aſſiſtant to the electric ſhock. The fixed air, contained in the water, being rarified by the action of frictional heat, promoted by the gentle ſhocks in great numbers, rendered the fixed air more fermentative, and was evidently a great aſſiſtant in the reduction of the dropſy. Notwithſtanding they had ſeverally uſed the water ſeveral weeks, they were not apparently bettered by it. The ſame held true of electrifying for ulcers, tetters, ſcrofula, inflammations of a part, &c. the ſhocks being conjoined with the pool-water, wrought wonders in clarifying the blood of bad humours in a very ſhort time, much ſhorter than was uſual for electricity to effect the ſame cures

with or without the aſſiſtance of any other means.

I ſhould adviſe thoſe, at leaſt, who have an internal dropſy, and are diſpoſed to have it treated by electricity, to uſe the pool-water at Ballſton, at the ſame time; to drink very freely of the mineral, and then, by great numbers of light ſhocks, to rarify the fixed air taken in by the water. The ſhock will open all the natural evacuations, ſeparate all coagulated, and accelerate and carry into the circulations any retained fluids. How much more fermentative the fixed air, being rarified; how much more power of operating agreeably upon the fluids, they being ſufficiently attenuated,* and how much more powerful in propelling humours, morbid affections, &c. towards the proper evacuations; being by its own rarifaction preſſing towards all the extreme parts, and muſt promote the action of evacuations in every part. Hence the utility of conjoining this mineral in a dropſy, is ſo far evident, that it muſt leave a conviction on the mind of every judicious reader, capable of comparing ideas.

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* It is this fixed air, received into the ſyſtem by the mineral water, that produceth thoſe effects ſo fatal to people in a conſumption. The veſſels being languid and obſtructed in parts, in a great degree, cannot ſuſtain the action of the fixed air upon the veſſels and the fluids in the veſſels. The action of the air is not ſufficient to attenuate their morbid contents, and ſo carry them off into the circulation, or elſe diſcharge them: but inaſmuch as it rallies into action the leſs obſtructed particles till they fall upon an immovable obſtruction, they thereby augment the morbid redundancy upon thoſe languid parts; the iſſue is, nature ſinks under what it cannot ſupport. But let the ſhocks be firſt given to clear theſe paſſages, and I apprehend no ſuch danger. From ſimilar cauſes, we may infer the preſumption of immerſing in cold water, and throwing the blood with a ſtrong reflux upon weak and obſtructed vitals----let ſuch people eſcape the cold bath.

Gout.

THE gout is a very difficult diſeaſe to cure. It may be always relieved, and ſometimes nearly or quite reſtored, by the different modes of treating it by electricity. The old practice of giving ſtrong ſhocks in the gout, is univerſally diſcarded; it was a monſtrous abſurdity, and diſcredited electricity very much. Exceedingly light ſhocks may be paſſed upon the affected part; the deſign of them is to induce frictional heat, and ſtimulate the part affected. But a ſtrong ſhock will dilate and weaken; and this is oppoſed to every rational intention of cure.

Dr. Cavallo, in his medical electricity, ſtates the mode of treatment lately adopted in England, and which is found to be a valuable improvement in adminiſtering for the gout. They place the patient upon an inſolating ſtool, the affected part being covered with one or two thickneſſes of flannel, and with a metallic point extract the ſpark from the part affected; this ſhould be repeated three ſeveral times in a day, and continued an hour at each time. But I do not think it expedient to depend altogether on the extraction of the ſparks; but that light ſhocks ſhould be alternated with the extraction of ſparks, the more readily to diſcharge the irritative contents of the dilated and weakened portions of veſſels.

As the gout exiſts either in direct or indirect debility, high and conſtant inſolations will be of undoubted utility. The inſolation inſeparable from the extracting of the ſparks, may be, and undoubtedly is of ſome benefit; but to make this ſupernatural inſolation any eſſential intention of cure, it will be neceſſary to perpetuate the application of this invigorating power from day to day: for, notwithſtanding it inſtantly accelerates the circulations, by its enlivening effects upon the fluids; yet it doth not reſtore, as hath been obſerved, tone and durable action, but by a ſecondary effect, not a little ſimilar to the tenſion acquired by the gentle electrifications, which is deſcribed (vide page 67 and 68) as ariſing from frictional warmth. The extraction of the ſpark may be conſidered as having ſome affinity to theſe ſecondary effects of the inſolation and gentle electrifications.

I think it expedient for people ſubject to theſe paroxyſms to attend to theſe preſcriptions, and uſe the gentle ſhocks and the artificial inſolations in their beſt ſtates of health, in order to reſtore the habit, and prevent the paroxyſms. The method, or rather practice of treating this diſeaſe ſo temporarily, or at the term of the paroxyſm, is, in my opinion, imprudent. To prevent one fit of the gout, goes farther towards a cure, than to relieve many.

The gout being generally the production of the over-action of exciting powers, it requires a high degree of exciting powers to reach and effectually to affect the lower degree of excitability: but to raiſe this degree of excitement by a great proportion of an individual ſtimulus, appears to me not ſo agreeable as to uſe a combination of ſtimulants, eſpecially thoſe that conſiſt in the various modes of applying electricity. But I do not mean to exclude the aſſiſtance of other ſtimulating powers; but that in extraordinary caſes, or violent attacks of the gout, the moſt powerful of all the other ſtimulants, viz. opium, ſhould be conjoined.

Dyſentery.

I DOUBT not my reader will think me romantic in introducing this diſeaſe, to be treated by electricity. I am ready to confeſs, that in all probability, I ſhould never have ſuggeſted the idea of electrifying for this diſeaſe, but for the importunity of one man. A certain Mr. Huntington, at Ballſton pool, who had been exerciſed with a vehement dyſentery, or bloody flux, for about ſix days, and in great pain, urged me to give him a few ſhocks, merely to eaſe him of pain, (for he had obſerved the ſhocks to be almoſt an univerſal anodyne.) I, at firſt thought, refuſed; but as he was importunate, I finally gave him about twenty very light ſhocks, through the ſeat of the pain in his bowels, to his back; they directly purged him, and eaſed his pain: but after a few hours, the pain increaſed upon him: I electrified him as before; it purged, but with leſs blood than before.— This was repeated three or four times, and he was reſtored thereby, in thirty hours, or nearly that time: I gave him only one doſe of weak laudanum beſide. This experiment was uſeful to me, and many others, the next ſummer, when that diſeaſe prevailed, and was epidemic and very mortal in the towns of Galway, Greenfield, Milton, and part of Ballſton. I then reſided in Galway, where I had an opportunity of a thorough inveſtigation of the fact; and in about one hundred caſes, ſufficiently demonſtrated, that the gentle ſhock, taken through the inteſtines, was an infallible remedy againſt this diſeaſe; which, at that time, reſiſted almoſt any other mean; inſomuch that nearly two thirds, of infants in particular, fell victims to its fury. I was informed, that not a ſingle child, at the breaſt, ſurvived the diſeaſe, excepting two that were brought to my machine. It was an unlucky circumſtance, at that time, that I had no machine but one that was very large; the conſequence was, the patients were all brought to me, and ſome of them took cold in returning home, which procraſtinated their cure.

This ſpecific I immediately advertiſed in a paper printed at Schenectady; but the doctors in the adjacent towns, either never ſaw it or did not pay any attention to it. But I was informed that Dr. Lyon, near Lebanon pool, accidentally came acroſs one of the papers, and having a machine, immediately tried the experiment (for the ſame diſeaſe prevailed there at that time) and had the pleaſure of finding it to be no miſtake; for he loſt not another patient, but directly cured every one taken with the diſeaſe; who, notwithſtanding, loſt many before he made uſe of electricity.

Theſe ſpecimens of the ineſtimable benefit of electricity in a dyſentery, may ſuffice to evince the propriety of uſing it in all the like caſes. I have never known it to fail of making a cure in any one ſingle inſtance.

My method hath ever been to paſs the ſhocks from about the navel to the back, a little deſcendingly; ſometimes I have given twenty, and ſometimes thirty or forty very light ſhocks in the ſame direction at one time. The effects that were apparent, have always been uniformly the ſame in the bloody flux, viz. they would purge directly, and carry off an enormous quantity of blood in the firſt ſtool; but the appearance of blood will be leſs and leſs every ſtool, till all appearance thereof totally ſubſides. The electrification may be repeated twice or thrice a day; but then the number of ſhocks in one day ought not to exceed forty or fifty, in any caſe that I have ſeen; and theſe ſhocks muſt be ſo light, that if a well man ſhould take them through his arms, he would not feel them higher than his wriſts. Such a degree of the ſhook, is what I mean to have underſtood to be a very light, or a gentle electrification. I have mentioned it in this place, becauſe it is of the laſt importance that it be carefully attended to in this diſeaſe: and the more ſo, if the patient is much exhauſted, or in the laſt ſtages of the diſeaſe, approaching near to death.

Through good fortune, I did not loſe any by their taking cold, but it very much endangered ſome of their lives; wherefore I muſt enforce the injunction in this place; be very careful of the leaſt degree of coolneſs Obſerve, I do not ſay cold; that point would be fatal; but if you feel cool in the leaſt degree, you are wounded.

This is the only inconvenience to be regretted, in the uſing of medical electricity. The blood is attenuated by the ſhock, and thrown ſtrongly upon the ſurface, the pores are expanded, and there is no reſiſtance to a cold from the leaſt external coolneſs. The external temperature ought to be on a parallel degree of warmth with the blood in the veſſels, or nearly that. But in five, ſix or eight days after the ſhocks are deſiſted, the pores will begin to aſtringe, and by degrees reſiſt the approach of cold as before. When a diſeaſe is removed, aſtringent medicines may be adminiſtered to reſtore the habit in a much ſhorter time. I have made uſe of the bark, elixir vitriol, brandy, &c. for bracers, after electrification; but ſometimes opium anſwers a better intention.

The gentle dyſentery, white or green purgings in children, are immediately relieved by the gentle ſhock; it always regulates the digeſtion. I have given ten or twelve ſhocks, in this diſeaſe, to a child of four weeks old; and that ſingle electrification reſtored the child to health.

In the epidemic at Galway, I would not uſe any thing but the ſhocks, until I ſubſtantiated their infallibiliy, and made it evident to many people, that they were a ſure reſtorative, without any aſſiſting mean whatever. But that I may do juſtice in every page, and to every ſubject, it is neceſſary to obſerve, that none of theſe caſes were very far advanced; they were moſtly recent ones; the patients were all able to go or be carried abroad. If coſtiveneſs preceded the diſeaſe, a cathartic ſhould be given; for the ſhocks are not a laxative, in the ſenſe of a cathartic, but only a propellant of laxative contents; and that by ſpringing the inteſtines, the blood ſecreted in the inteſtines will be diſcharged, and a further effuſion upon the inteſtines will be reſtrained; but without a purge, coſtiveneſs may remain, to the detriment of the patient.

There may be a combination of complaints, in this or any other of the diſeaſes I have mentioned, to be treated by electricity, which may make it neceſſary to vary the manner of treatment by electricity; to conjoin different aſſiſting medicines, &c. &c. all of which, muſt be left to the obſervation and judgment of the electrician, phyſician, &c. The ſtrangury, that ſo often accompanies the vehement dyſentery, is always removed by paſſing a few light ſhocks down the urinary paſſages.

Cholic.

THAT which conſiſteth of flatulency and wind, is relieved by paſſing the ſhocks through the bowels, in the ſame manner as for the dyſentery: ſome of the laſt ſhocks ſhould be brought on as high as the breaſt, about midway, and paſſed down to the lower part of the ſpine. Theſe ſhocks being paſſed from above the region of the ſtomach, will prevent puking; which will ſometimes take place, if the ſhock is paſſed altogether below the region of the ſtomach. Shocks given in this direction will purge, in the ſame manner as they will in the vehement dyſentery. I have given from ten to forty ſhocks, on ſuch occaſions, and they have given all the relief that was neceſſary, in the moſt of caſes; ſometimes I have added an internal ſtimulant. When this diſeaſe is conjoined with vomiting, the ſhocks muſt be brought on as high as the ſides of the neck, and paſſed down to the lower part of the ſpine, or back-bone; it will immediately check the puking, and purge very freely. People that I have electrified in this diſeaſe, ſome years paſt, tell me that they have ever been leſs troubled with that complaint ſince the electrification, than what they were formerly.

I uſed the ſhocks on one man, at Galway, whoſe life was almoſt exhauſted in one hour. It was a tremendous diſcharge of blood, both ways, I directed the ſhocks as juſt now deſcribed, and the effect was an inſtant ceſſation of vomiting, but purged ſeverely for a minute or two. I rallied his ſtrength with a doſe of opium; and a little of the bark put him on his legs very ſoon.

The cholic that is attended with coſtiveneſs, muſt be treated very differently. The ſhocks effect nothing in diluting the denſe feces; moreover, it is imprudent to paſs many ſhocks on the inteſtines in this ſituation; the conſequence is, that the elaſticity of the ſhocks irritates the inteſtines, by ſpringing them, while their contents are in a ſtate ſo capable of chafing and wounding this part, which, of all the ſyſtem, is ſuppoſed to be moſt irritable, and moſt eaſily inflamed. Wherefore, all the uſe that can be had of the ſhock in this caſe, is, to accelerate the operation of the phyſic, when there appears to be any difficulty in its operating. It is of great value in this particular caſe. Any perſon that only knows that geſticulation

quickens the action of an emetic or cathartic, will want but little argumentation to convince him that the gentle ſhocks claim a very great aſcendency over any kind of geſticulation that any perſon may be capable of. Moreover, it is moſt commonly the caſe, that people who need theſe helps, are not capable of action, or geſticulation, in any degree that will eſſentially affect the operation of phyſic. Hence electricity claims conſiderable merit in this particular reſpect.

When it appears neceſſary to uſe electricity with an intention of forcing the action of a cathartic in obſtinate caſes, the proper method will be, to paſs about eight or ten ſhocks at one time; and if the caſe is urgent, or the circumſtances of the patient demand immediate relief, to repeat about the ſame number of ſhocks, once in twelve or fifteen minutes, till the phyſic ſhall operate. The phyſic may be given about fifteen minutes previous to the firſt electrification.

When there is any difficulty in keeping an emetic or cathartic in the ſtomach, the ſhocks being paſſed from about midway of the os iternum, or breaſt bone, to the lower extremities of the ſpine, will prevent their coming up prematurely—the ſhocks turned down the pereſtaltic motion. It is impoſſible, however, to prevent, if it were neceſſary, the action of an emetic by giving the ſhocks downward; but its emiſſion from the ſtomach will be rapid for a ſhort time, and then it will act cathartically. I have frequently known a doſe of emetic tartar to produce all this in five-and-twenty or thirty minutes, by the aſſiſtance of thirty or forty light ſhocks: but in forcing the emetic to throw up from the ſtomach more powerfully, I have paſſed the ſhock from juſt under the region of the ſtomach to the ſide of the neck: When this action was ſufficient, I would turn the ſhock downward, as before mentioned, and it will purge in a few minutes, &c.

Aſthma.

I AM not certain that this diſeaſe can be finally cured by the ſhocks. But one thing I am very certain of, and that is, it will give inſtant relief in a fit of the aſthma, and will throw it off for that time. My experience goes no further than juſt to underſtand thus much of the uſe of the electric ſhocks, in this caſe.

One perſon, who had been conſtantly troubled with this diſeaſe for years, was free from it almoſt entirely during one year, by taking about thirty ſhocks at one time. The circumſtances have always been ſuch, that I have had no opportunity of making a thorough experiment: Moreover, the great difficulty there will always be, till people grow more rational, to perſuade them to that degree of precaution that would be neceſſary to make a fair experiment, or finally to determine whether a proceſs of electrification would avail to eſtabliſh health. Without the moſt ſcrupulous attention, many colds would intervene, and would render all attempts to effect a cure abſolutely abortive.

The manner of electrifying in this caſe is, to paſs the gentle ſhocks from the right ſhoulder to the left ſide, juſt under the left arm: about fifteen or twenty may be given at one time; but ſometimes leſs will ſuffice to throw off a fit of the aſthma.

This is a caſe that merits a treatment by the artificial inſolation. If any perſon hath leiſure and abilities to make the experiment for a few months, I doubt not but that they would find their advantage in ſo doing.

As electricity ſeems to be the laſt and only reſort to which people can apply with any hope of ultimate ſucceſs, in this diſeaſe, it would ſeem prudent to give it a fair trial. I think a lengthy inſolation, alternated with the gentle frictional electrifications, would at leaſt go very far in removing an aſthma, as well as many other caſes of obſtinate debility. To make the experiment in a proper manner, will require an inſolating bed, or a bed ſtanding upon glaſs, that the patient may ſleep in the plus electrification, and not depend on what may be performed in the day time only.

Diabetes.

THIS diſeaſe hath been, and is yet, very often fatal under ancient practice. The old method of treating it by abſorbents, is now totally diſcarded, excepting by a few obſtinate antique practioners, who value their antiquated education more than the lives of their patients; who are too wiſe to learn any thing, and, I had almoſt ſaid, to know any thing. But, happily for mankind, it is now known to be eaſily removed, by treating with diffuſables, ſuch as promote ſecretions, perſpiration, &c.

The exceſſive action of the kidneys in ſecreting urine from the blood, is removed or prevented by promoting the ſecretion of the perſpirable vapour: and if you have nothing that will produce this effect eaſier and quicker than the electric ſhocks, you may uſe them, and they will anſwer the purpoſe; or if all other means prove ineffectual, yet will not this mean. The ſhocks may, and muſt be paſſed in every part of the ſyſtem daily, till the diſeaſe is removed, and health reſtored. About forty ſhocks may be daily given; but they muſt be of the moderate kind. When this diſeaſe is ſuffered to remain long, indigeſtion will be very likely to enſue, and coſtiveneſs, which will require ſome other aid to remove, beſides electricity. But, even in this ſtate, it is not always ſafe to depend on phyſic altogether: it will ſometimes prove fatal; as alſo in a dry bilious cholic. In this

ſituation, recourſe muſt be had to a peculiar diet, and that of the ſoluble kind, ſuch as meat broiled on fire-coals, and mutton broth; and, in a deſperate caſe, the entrails of a ſheep, boiled to a pulp-like conſiſtence, and with a trifle of ſalt, will anſwer an excellent purpoſe in healing, ſheathing and promoting, and inducing an eaſy action in the paſſages, and will make a repetition of cathartics unneceſſary. But what is the ultimatum of treating a confirmed ſtate of coſtiveneſs with common purges? True, they grant a temporary relief, but with more and more difficulty, as the repetition is made; and that, becauſe they diminiſh the already too ſcanty nutriment of the ſyſtem. This general deficiency effects a particular deficiency, at leaſt ſometimes, of bile, pancreatic juice, gaſtric fluid and ſaliva, a due degree of which are neceſſary to ſupport the digeſtion. The diſcharge of the digeſtive fluids into the ſtomach, duodenum, &c. may be promoted by the ſhocks; but to continue a diminution of their ſource is imprudent: A better method appears to be, to ſupply the moſt nutricious food poſſible, and that of the eaſieſt digeſtion, ſoluble and healing to the bowels, ſuch as is above recommended, with brandy and molaſſes for conſtant drink. Let this regimen be conſtantly obſerved, and gentle ſhocks repeated daily, till the patient is reſtored to health from a diabetes, or confirmed coſtiveneſs in any caſe. This caſe demands particular attention to a ſteady degree of warmth.

Urine ſuppreſſed—bloody and hot.

I HAVE uſed the electrical ſhocks in all thoſe different ſtates or ſtages, and have known of no ſingle inſtance of failure of immediate relief, or of relief in a few hours, and always terminated in a radical cure. The manner of paſſing the ſhocks has been from about midway of the ſpine, or back bone, to the inſide of the thigh, ſo as to bring the ſhocks down the urinary paſſages. Some ſhocks may be paſſed through the lower belly to the back, about ten in each direction; and if the caſe is urgent, they may be repeated twice, and ſometimes thrice, in one day.

Some European authors have recommended the ſhocks in the gravel; but this, I think, muſt have been a miſtake, ſuch as I have, in my firſt practiſing in electricity, made myſelf. People have applied to me for aſſiſtance in the gravel, as they called it; but I have reſtored many ſuch gravels by fifty or ſixty light ſhocks, and might have had the reputation of working what would have been, to a man of ſkill, a miracle: but I immediately told my patients, in theſe caſes, that it was no gravel, but a ſtrangury, after I had once diſcovered my miſtake; and ſuch hath been the miſtakes among thoſe European electricians. Notwithſtanding, I think it adviſeable to electrify in a gravel, in order, at leaſt, to prevent an increaſe thereof,

and to ſuppreſs irritation and inflammation. Moreover, the ſhocks may be of further uſe; they may be neceſſary to pave the way for voiding the gravel from the bladder of urine, not only by removing irritation from the bladder and urethra; but alſo, by expanding or dilating the urethra, the paſſage is rendered more capable of carrying off thoſe denſe bodies. But to ſuppoſe the ſhocks to act as a reſolvent upon the gravel, is to me unaccountable; and I am determined to aſſert nothing for a fact, in this book, but what my ſenſes have been witneſs to; what is but conjecture, I have explained as conjecture, offered my reaſons, and ſubmitted it to the judgment of mankind.

Although I cannot believe that the electric ſhocks act as a reſolvent on a conſiſtence ſo denſe as theſe bodies are known to be; yet I am convinced, from very many inſtances of demonſtration, that they are an infallible diuretic, as well as a diaphoretic. I know it is unaccountable, yea, and laughable with ſome people, (who, by the way, are totally ignorant of the whole matter) that the ſame medicine ſhould be repreſented as capable of producing contary effects. I have preſcribed the electric ſhocks for the diabetes, or an exceſſive evacuation of urine:—now I am recommending the ſame medicine as an excellent ſpecific to reſtore a deficiency of urine. "We are not acquainted with ſuch ſpecifics, nor ſuch contradictory preſcriptions!" Very well; neither have you been acquainted with medical electricity. This is that mantle of charity I have caſt over the faculty, (vide c. 2, p. 62.) Nothing but a want of information on the ſubject of medical electricity, can exculpate phyſicians from a crime, dark as the grave, and horrid as murder! But there is no contradictions in my preſcriptions of this ſpecific, of its being capable of removing a diabetes, by duly mixing the ſubſtances of the blood, and attenuating the fluids generally, and affecting the whole round of ſecretions, and promoting a due degree of action upon them all; and conſequently of ſecreting the perſpirable vapour. Theſe united productions muſt check a profuſion from the blood in the kidneys, and ſo reſtore a diabetes. And as to ſuppreſſion of urine by ſtrangury, irritation or ſpaſm, or any kind of obſtruction (excepting the ſtone or gravel) either upon the ureters or the urethra, the dilation of the ſhock, its attending effect, is equal to the removal of obſtructions of one deſcription; and its ſtimulating frictional warmth and rarifaction is equal to another. And as to a deficient action in the kidneys, in ſecreting from the blood a due quantity of urine, this is again a deficiency of ſecretion; and the ſame remedy that cures a diabetes, by acting upon the ſecretory veſſels, will alſo, by the ſame actions, reſtore a deficiency of ſenſation in the kidneys. I am not the only one who has diſcovered the power of the electric ſhocks, over a deficiency of

ſecretions. Dr. Cavallo aſſerts, that the ſhocks promote ſecretions univerſally. Certainly they muſt have this effect, inaſmuch as they do mix, attenuate and rarify the whole maſs of fluids, and, at the ſame time, expand and dilate the minute veſſels, every where in the ſyſtem: being conducted, as hath been demonſtrated, through the veſſels every where, in every part where there is fluids to conduct, this ſubtile effluvia will fly and expand, dilate and attenuate upon the whole maſs of fluids, and thro'out the whole vaſcular ſyſtem. Who can but exclaim, what a mean of health! what a preſervation of life has been ignorantly proſtituted to mere amuſement!

N. B. I have been credibly informed, that when a ſtone, which had been extracted from the urinary bladder, had been put into a veſſel of Ballſton pool water, or that of Saratoga pool, which is ſimilar, that the mineral proved a reſolvent upon the ſtone, and diſſolved it in a ſhort time: but there is need of caution in uſing the water in ſuch caſes. During a ſummer which I ſpent at Ballſton pool, a man living in that place aſked my opinion concerning the uſe of electricity, and of the pool water, for the ſtone in the bladder: I replied, that electricity was uſeleſs, and that the mineral was ſuch a powerful diuretic, that I thought there was danger of preſſing the ſtone into the neck of the bladder, and might have a bad tendency; at any rate, the water ought to be uſed moderately. He ſaid ſome doctors had adviſed his father to the uſe of the mineral in that caſe, and to drink all he could of it, and his father had come to his houſe to try the experiment. I again cautioned him to uſe it moderately at firſt; for I was very certain there was danger of a very free uſe of ſo powerful a diuretic, in his father's ſituation. But it appeared that his father followed the counſel of his doctors: he drank ſome quarts of the water, as I was informed, in a very little time; I think in about one hour; but it proved true that the ſtone was preſſed into the neck of the bladder, and no means could be found to reſiſt it. The man continued a few days in great agony, and then expired. I have mentioned this fact, for a caution to any perſon, who may apply to the ſame mineral in a ſimilar circumſtance, that they uſe the water but very moderately at firſt, and take time to make the experiment in a more judicious manner.

Menſes obſtructed, &c.

A SUDDEN obſtruction from cold, or any other accident, may be reſtored, moſt commonly, by a ſingle electrification. About forty ſhocks, of conſiderable force, in a firm conſtitution, have often given complete relief: they ſhould be paſſed, ſome through the uterus from the fore-ſide to the back, ſome from the back to the inſide of the thigh, and from all round the waiſt to the feet. I have known this operation, in a ſanguine habit, to give relief before they left the machine.

But in a penury of blood, languor, deficiency of excitement, &c. the caſe is quite diſſimilar, and requires more patience to reſtore: It calls for all the mental and animal ſtimulants or application of remedy to be made, both to body and mind, in ſome particular caſes. If it is cauſed by diſappointment in love, intenſe grief, cauſing a dejection of ſpirits, the application muſt be made to the mind, if poſſible. If the object of deſire cannot be obtained, the unhappy ſufferer ſhould be removed to a place and company, where there is no knowledge, no mention of his name; ſhe muſt not be ſuffered to live in the houſe, nor walk a road where ſhe had ever enjoyed his company. Theſe precautions and neceſſary pre-requiſites being attended to, let her have lively company, frequent entertainments and amuſements, often riding on horſeback and in carriages, generous wines, nutricious ſoluble diet, and, if they can be had, frequent inſolations; and, to make a completion of cure, let her be electrified, but very lightly, in the ſame directions above named, and repeat it from time to time, but eſpecially at the periodical times, as nigh as may be, that the artificial effort may join hand with the natural, in producing the deſired effect.

When a dejection of ſpirits hath had no hand in inducing a ſuppreſſion, &c. there will be leſs difficulty in the cure. Dr. Cavallo, in treating of this caſe by electricity, ſpeaks very confidently and emphatically; and intimates, if I remember right, that there is no failure of cure, under a proper treatment, by the electric ſhocks. From what I have obſerved in a long practice, I have reaſon to believe that very few, if any caſes of partial, or even total ſuppreſſion of menſtruation, would be able to reſiſt the power of the ſhocks in remedying this complaint: but when it has been of long continuance, more time will be occupied in eſtabliſhing a due action in the part; indeed, the intention of cure muſt be directed to the whole ſyſtem, to increaſe the vital ſtimulus of blood, to enliven the mind, and animate the functions both of body and mind, as much as poſſible. The electric ſhocks keeping the fluids duly attenuated, and every paſſage of evacuation open and free, the eſtabliſhment of health will be complete, as ſoon as the quantity of vital ſtimulus is ſufficiently increaſed.

If the ſupernatural inſolation is of any uſe in any caſe, no one will doubt the propriety of making uſe of it in this: It appears to me, to be peculiarly adapted to aſſiſt in this deficient action. There can be no doubt, but that an agent ſo invigorating, ſo ſtimulating and enlivening to the motion of the fluids, muſt, by a ſuitable application and continuation, produce a very valuable effect in removing a ſtate of deficient excitement, and in eſtabliſhing health

from any diſeaſe which hath originated or doth exiſt in debility, either of the direct or of the indirect kind.

King's Evil.

I MUST intrude my catholicon upon the ſtage a little longer, that its abilities may be further exhibited: nor ſhall I bluſh to own, (and that in the face of thoſe who ſay, a medicine that is good for every thing, is good for nothing) that there are ſeveral diſeaſes not yet named, in which electricity is an admirable ſpecific. If you can find nothing more faſhionable, or infallible, in curing this ſcrofula, than the electric ſhock; or if you can ſtoop to a mean ſo ſimple, and but little in faſhion and eſtimation; or if you will not be aſhamed to obtain your cure ſo cheap and eaſy, then you ſhall be directed to an infallible cure. Firſt, the part on which the ſhocks are to be applied, muſt be warmly covered, and that ſteadily continued until perfectly well. The ſhocks muſt be paſſed through the ſeat of the diſeaſe: they muſt be, at leaſt ſome of them, ſmart ſhocks, in order to ſeparate the coagulations, accelerate the contained fluids, and dilate and open the paſſages, that ſo the circulations may be again performed. I need not ſay much on this head; only that the part be kept warm, and indeed the whole body, and about twenty or thirty ſhocks daily to be given from juſt above the ſeat of the diſeaſe, and paſſed down to the feet. I would have them paſſed to the feet, that the whole maſs of fluids may be clarified, and that there may be no danger of any ſudden return of the diſeaſe. Continue this daily till well.

Cancers.

A GREAT part of the world of mankind have been buſied in combating cancers: thouſands of noſtrums, and infallible cures, have been invented; and almoſt any body you meet on the road, can preſcribe a certain cure for this obſtinate and dangerous diſeaſe.

It is not my intention to adviſe any body to throw away any infallible remedy, for electricity; nor any valuable ſpecific, that may aid or aſſiſt in the cure; nor abſolutely to believe that electricity can cure all ſorts of cancers, without the aſſiſtance of ſome other medicine.

But as it ſo happens, that among all theſe noſtrums, and infallible ſpecifics, ſome people are ſo unfortunate as to fall victims to this diſeaſe, I hope I may be pardoned in recommending electricity to thoſe who are employed in the art of healing, as a very valuable aſſiſting mean; and I had almoſt reſolved to ſet it as high as a bunch of roots and herbs, and ſo to call it an infallible cure for cancers. But there is a difficulty in monopolizing it as a noſtrum; every body will know my medicine, and the whole world will turn quacks. I may as well divulge the ſecret, and let my neighbours have the benefit of it, if there is any to be had.

It will be readily conceived, that if the electric ſhocks do, in their action upon fluidities, veſſels, &c. ſeparate the coagulated particles of blood, accelerate the retained fluids, and dilate and open the paſſages, that they ought to be eſteemed one of the moſt valuable diſcutients on earth: not only becauſe they are the moſt powerful; but from a conſideration of their being as eaſily applied to any internal part, as to the external. This gives them an infinite preference to any other diſcutient known in the world.

The utility of the electric ſhocks, in diſcuſſing a ſcrofulous tumour, or virulent ſore, is ſo obvious, that I need not uſe importunity to perſuade any perſon to put it to actual experiment.

The method I have made uſe of myſelf has been, to paſs the ſhocks through the ſeat of the cancer, to repeat the electrification daily; or elſe, once in two days, to give ſometimes ten, twelve, fifteen or twenty ſhocks each time. About one ſhock in twenty ſhould be raiſed to a ſtrong degree, the more ſurely to diſcuſs and carry off the retained fluids, and thoroughly to break up the ſeat of the humours; but the remainder of the ſhocks may be light. The ſtrong ſhocks will ſeparate the coagulations, and dilate the paſſages; and the reſt, being light, will be ſufficient to propel off the morbid humours.

In electrifying for a cancer, as well as for a king's evil, it is beſt to paſs many ſhocks through every part of the ſyſtem, and thoroughly attenuate the blood: keep the body continually warm, that the perſpiration may not be interrupted, but that the humours may be cleanſed, and the blood totally clarified of the ſcrofula.

If the cancer is in or about the head, then the head muſt be warmly covered, and the face, ſo far as to keep it in a perſpiration. Do not dream of making a cure, unleſs theſe inſtructions are rigidly attended to. Do not ſay, as many will, "I am not apt to take cold." This has been the eternal diſgrace of electricity, and will continue ſo to be, unleſs people can be perſuaded to be all attention, to be continually upon their guard, that not the leaſt degree of coolneſs approaches them for a moment.

I have uſed electricity on ſeveral cancers: the firſt was on myſelf. Suffering much pain, by various applications, and all to no good effect, I began to deſpair of a cure: But, having obſerved the effect of the electric ſhocks upon other kinds of ſores, after ſome reflection, I was determined to make the experiment on myſelf. (This was about the firſt of my practice.) Accordingly, I took fifty very light ſhocks, directly through the cancer; afterwards I took about twenty daily, moſtly very light. This I continued ten or twelve days: Then I deſiſted as many more days; by which time I ſaw the cancer was nearly well; and I have not been troubled with it ſince, which is about eight years. But this application was made in three or four months after it was diſcovered to be a cancer.

The ſecond caſe was a young man from Albany, whoſe name has ſlipt my memory. He called on me at Ballſton pool. He had what is called a ſpider, on his face, but a recent one: its head was not larger than a pea; but it was evidently a cancer, from the ſymptoms of ſympathy, which he ſaid were like a ſtinging, darting from its ſeat round about his face. To be ſhort; he was electrified a few times, and it totally diſappeared, and every ſenſation of it.

The third was a lady, on a viſit from the city of New-York, to her friends in Claverack. Hers was of the former deſcription, only about the ſize of a large bean, accompanied with the former ſymptoms; and was a cancer, in the judgment of different phyſicians, who had ſeen it in New-York. While ſhe tarried, I electrified it three or four times, on different days; and it was almoſt reduced before ſhe left the place.

I have electrified ſeveral others in an accidental manner; and the ſhocks always abated the irritation, ſmarting, and uncomfortable ſenſations of the cancer: But not having an opportunity of making a thorough trial upon thoſe that were bad, and were very malignant, I cannot avouch for the ultimate effect of electricity, in all caſes and ſtages of a cancer.

Doctor Cavallo, in his medical electricity, ſtates the treatment of a very bad cancer, on the breaſt of a woman, in England, which reſiſted all medical aid for a long time, and was like to prove fatal. At length, a certain gentleman propoſed to try the experiment of treating it by electricity. Accordingly, the trial was made; and the conſequence was, that the ſenſation of pain immediately abated, the cancer diſcharged freely for a time, and the parts began to contact and heal; and, when Cavallo wrote, the cancer was (and that contrary to the expectation of the gentleman who attended it) likely to get entirely well.

I have not that author's writing by me at this time, or I would copy their manner of treatment, by electricity. Cavallo mentions their extracting the electric ſpark from the cancer, which proved very beneficial: But they diſcovered an eſſential difference between extracting the ſpark a by ſteel point, and by a wooden one. The wooden point, if I remember right, would irritate,* or in ſome manner would leave a diſagreeable ſenſation, which did not facilitate, but rather backened the cure; but the ſteel point was quite different, and had a very ſalutary effect upon the cancer. Theſe points muſt not be ſharp.

But I cannot diſcover any cauſe for the extraction of the ſpark producing any effect more conducive of cure, than the gentle ſhock. The action of extraction ſprings the muſcle whence it is extracted, and conſequently accelerates the motion of the fluids in that particular part; and ſo will the ſhocks, in a manner, as I think, more agreeable: For, let the ſpark be extracted by what inſtrument it will, it doth tend, more or leſs, to inflame the part: And if the promotion of inflammation anſwered any good purpoſe, then the point that was moſt conducive of inflammation, would have had the beſt effect; but the contrary of all this proves true, by their own confeſſion. Wherefore, it is the gentle ſhocks, or theſe chiefly, which produce the valuable effects not only on all kind of malignant ulcers, (which Cavallo aſſerts they will heal) but alſo on cancers.

There is another method of uſing electricity, not yet mentioned—a method I have invented for healing of ſore and inflammatory eyes, and ſome other ſlight complaints; and that is, by blowing what I have named the aura, upon the part affected. I have named it aura, becauſe its appearance reſembles the aurora-borealis, or northern light, or the appearance of the tail of a comet. The ſenſation of it is cold, as a cold northern wind, when it falls upon any part of the naked ſurface of the body, and is luminous. I have blown it upon a burn from a hot iron; and it hath immediately eradicated the fire from the part. I have uſed it on the eyes, when ſore, and having a ſenſation of being filled with ſand; and it gives relief in one minute.

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* If the wooden point tended more to irritate and inflame the part, ſurely it would be the beſt inſtrument to extract the ſpark by, when it is intended to promote inflammation and ſuppuration.

I have never uſed it upon a cancer that was corroded, nor on any other; though, from its effects on ſores, I think it may anſwer a valuable purpoſe: but inaſmuch as the part muſt be uncovered, in order to make the application, it muſt be done in a warm, very warm room, eſpecially if it be within a few days of the perſon's taking ſhocks, or elſe they will take cold by being uncovered.

The manner of performing the operation is thus: Take a metallic rod, or the largeſt kind of wire; let one end be brought to a point, and the other end, by a hook, connected with the prime conductor: the pointed end muſt be brought within an inch, or two inches, of the part on which the aura is to be diffuſed. If the operation is to be made on the eye, great care muſt be had that the point is not ſtruck into the eye: the perſon's head muſt be ſteadied by a careful hand, and ſpectators kept at a diſtance from the operator. It will often make a perſon ſneeze; on which occaſion they muſt be cautioned to throw their heads on one ſide

of the pointed inſtrument. When this is blown upon an eye, it will cauſe the lachrymal to diſcharge freely; this is ſuppoſed to be done by the aſtringency of the aura, in contracting the parts.

It may be obſerved, that the aura is not an expanſion of elementary fire, but ſo great a denſity, as to render it cold; which is one reaſon of my ſuppoſing cold to conſiſt in a denſity of elementary fire.

After the body of humours in a cancer is ſufficiently diſcuſſed, I think it is probable that the aura, diffuſed freely upon the part, muſt contribute conſiderably in cleanſing and healing the ſore.

The aural diffuſion is kept up by a continual turning of the cylinder, or conſtant promotion of friction. The machine ſhould be large: Beſt of all to be carried by water-works.

A cancer that is thoroughly formed, and virulent, will require ſome months to complete a cure; wherefore, much patience muſt be exerciſed by the operator, as well as by the patient.

N. B. I ſhould have mentioned, that the pointed end of the aural rod (for ſo I call it) muſt be ſupported by a gooſe-quill, either bent round the rod, or the rod inſerted through the end of the quill, a waxed thread being firſt drawn lightly round the end of the quill, to prevent ſplitting quite to the end. The fire, or effluvia, will not paſs off upon the quill; and the quill may be taken in hand, within two inches of the rod, and held to the part intended.

Quinſy.

THE electric ſhocks are an effectual and ſudden cure for the quinſy. Bring on the ſhocks a little above the affected part, and paſs them down to the lower extremities. If it is done in the firſt ſtages, they will carry it off at once: If in the laſt ſtages, they will break it immediately, by the dilation of the ſhocks, ſtriking into the ſuppurated matter.

I have uſed the ſhocks frequently on the quinſy, and have ever found gentle ſhocks to anſwer the purpoſe; and the ſhocks hardly ever need repeating more than twice or three times: ten or fifteen are ſufficient for one time. Let the part be covered.

Sore throat, inflammatory ſore throat, canker, &c. in the throat and bowels, may all be aſſiſted, and finally cured, by gentle electrifications through the part, and covered warmly.

Vertigo.

VERTIGO, or ſwimming in the head, proceeds from a redundancy of blood, cauſed by the over-action of the aſcendens aorta. To prevent or cure, let ſtrong ſhocks be paſſed from the ſides of the neck, quite down to the feet. The ſhocks will reſtore an equilibrium of the circulations, and throw off the redundancy

from the head. Six or eight pretty ſtrong ſhocks are generally ſufficient to effect this.

Head-Ache.

HEAD-ACHE may proceed from ſeveral cauſes: from compreſſion of a part; from irritation of the nerves; from a foul ſtomach, and from a redundancy, either with or without univerſal inflammation. When it proceeds from a redundancy, it may be cured as vertigo, juſt mentioned. If it proceeds from compreſſion, it may be helped by paſſing ſhocks through the head, to the feet. If it proceeds from irritation of the nerves, it may be helped by giving a few light ſhocks upon the nerves univerſally, down the back of the head, to the feet, &c. and repeated once or twice in a week, for ſix or eight months. This will be as ſhort a time as may be expected, to remove a pain in the head, commonly in the brain and back part of the head, proceeding from nervous irritation. If it proceeds from a foul ſtomach, a puke is the beſt remedy.

There is a periodical head-ache, which will commence with the riſing ſun, and continue till it is paſt the meridian. This I have ſeveral times cured, when it had continued for months, and had become very tedious: indeed, I have never failed to cure the pain in a few hours, by fifteen or twenty pretty ſtrong ſhocks, from the head to the feet. Sometimes the original pain will be removed; but the patients, by taking cold, will have a pain through the whole head, and will ſuppoſe the ſhocks have done them hurt; but after the cold has left them, they have found their heads well enough.

Deafneſs.

When deafneſs is cauſed by colds—by a retention of the cerumen auris, or ear-wax, in the glands of the ear, cauſing a rigidity, dryneſs, hardneſs, and conſequently an imperceptibility of vibration of ſound upon the membrana tympani, or obſtructs the communication to the interior membrane of the auditory nerve, all which may happen by a deficiency of ſecretions in the glands of the ear; or if it is cauſed by torpor, compreſſion, &c. on the auditory nerve; in all theſe caſes, electricity may be ſuppoſed to be uſeful. It is uſeful to remove the cold that cauſes the deafneſs: it is uſeful to promote a diſcharge from the glands of the ear, and thereby to bring on moiſture on the drums of the ear, and conſequently a ſuſceptibility of ſound; and, in caſe of torpor on the auditory nerve, to recover a ſenſibility, or remove compreſſion, inaction, &c.

Before a ſingle ſhock is given, let the head be warmly covered; then light ſhocks may be paſſed through the head from ear to ear. Ten, fifteen, or twenty light ſhocks may be given in one day, and continued till hearing is reſtored. After electricity is deſiſted, waſh the head with brandy, daily, and leave off the

covering of the head by little and little, leſt the perſon take cold.

Sometimes, there will be a ſtoppage in the ear, by a denſe body of ear-wax: The beſt method to remove this, is to ſyringe with warm water repeatedly, and ſtop the ear with black wool.

Inflammatory Eyes.

I have always had great ſucceſs in treating inflammatory eyes, with very light ſhocks, paſſed from all round the eyes, to the back of the neck, and ſome paſſed down to the feet. I have given forty, fifty and ſixty in one day; but they were almoſt imperceptibly light.

The aura is of ſingular uſe in this caſe alſo. Any perſon uſing the electric ſhocks upon their head, and eſpecially upon the face, muſt abſolutely keep in the houſe, or be blinded with covering over their faces, when they go into the air.

I reſtored a daughter of General Patterſon, who had been blinded totally with inflammation; it occupied but five or ſix days, during which time, I uſed the gentle ſhocks, and the aura twice a day. It was not more than ſix days, before her viſion was able to receive the brilliancy of meridian day with eaſe, and perfectly tranſparent.

Film.

I have intirely a new method of removing a film, or rather of ſuppreſſing inflammation, that hath ſo embarraſſed the removal of films from the eyes. You will ſuſpect I make uſe of electricity to effect this ſuppreſſion of inflammation, ſince I have recommended it as an excellent ſpecific in removing inflammations from the eyes.

There are many methods of operating upon the film; but vain attempts to ſuppreſs inflammation have been the diſgrace of the practice. But that difficulty is now to be ſurmounted: electricity, by the gentle ſhock, and by the diffuſion of the aura upon the eyes, is the agent to produce this effect. It muſt be uſed in the ſame manner, and under the ſame degree of warmth, as preſcribed for inflammation in the eyes. Purges, in ſome caſes, are uſeful, and it is expedient to adapt the regimen to the common method in all ſuch caſes.

I have commonly uſed the luna cauſtic, but would electrify one day at leaſt before the application of the cauſtic; ſometimes I have touched the eye lightly, twice a day, and gave a few light ſhocks ſoon after, and ſometimes uſed the aura: by this proceſs, a film may always be removed, and the inflammation kept off, or it will be but temporary, exiſting a little time after each particular application of the cauſtic to the eye.

Gutta Serena.

HAPPILY for mankind, a remedy for this kind of blindneſs is now diſcovered, and very generally known in Europe, if not in America.

Weſley, Graham, Cavallo, Lovett, and all that have had any conſiderable experience in electricity, are high in the opinion of its uſefulneſs in the gutta ſerena, and in blindneſs from ſome other cauſes. Weſley writes of a cure of blindneſs by gutta ſerena, of twenty-four years ſtanding, performed altogether by electricity.

I am not fully convinced that the ſame degree of tranſparency can be induced, that was natural before the blindneſs happened, eſpecially when the blindneſs has been of long ſtanding.

That I may reflect the moſt light on the ſubject in my power, I will briefly relate my ſucceſſes in the treatment of ſeveral caſes of blindneſs, by electricity; and if it appears that my ſtatement of facts contains any exaggerations, any perſon is welcome to rectify my miſtake, in this or any other inſtance, in the public papers.

There are many caſes of partial blindneſs that I have reſtored, which would be too tedious to mention; and ſeveral I ſhall not mention becauſe I cannot recollect their names and places of abode.

The firſt I ſhall mention is Henry Barager's caſe, who belonged to Kinderhook. His blindneſs was induced by a ſurfeit; his caſe was a little ſingular: he had flaſhes of light, ſomething ſimilar to what a perſon experiences in a dark night, from flaſhes of lightning, which helped him to find a road, but with ſome difficulty: his viſion was a ſpecimen of the ſtate of his mind; he was wild, incoherent and bewildered. The firſt application for his relief, was made to Dr. Bartrop, an eminent phyſician from London, in England, but now lives in Kinderhook, on the river Hudſon. The doctor, after examining his caſe, told him the moſt likely means to help him would be electricity; and as his own machine was out of repair, he adviſed him to apply to me at Chatham; he accordingly came to me, in the ſituation before deſcribed.

I electrified him twice a day, by paſſing about twenty light ſhocks from round about his eyes, and from every part of his head, to his feet, or lower extremities. This I repeated three days, and in about ſix days it terminated in a complete cure of his blindneſs, as well as the diſordered ſtate of his mind.

A Mr. Burhite, of Schodac, two miles from the Hudſon, eighty-three years of age, totally blind three years: as I was in buſineſs within a few rods of his houſe, at Miches-kill, having ſaid ſomething of the uſe of electricity in caſes of blindneſs, Mr. Burhite's ſtate was mentioned: I propoſed to try the experiment; but the people viewed my undertaking as a piece of

preſumption and folly, he being blind by great age: the ſecond operation I made, however, gave him a view of objects nigh at hand, and a third one enabled him to walk without a guide: his wife told me that he could diſtinguiſh the hoops of a churn that ſtood on the oppoſite ſide of the room, and could take the tongs and light his own pipe, which relieved her of ſome trouble.

In a little time after, he rode ten miles to me in a ſleigh, to obtain another operation by electricity, which was much to his damage; for in riding home in a cold day, notwithſtanding his covering, he took a ſevere cold, by which he nearly loſt his ſight again, as I was informed, but I have not ſeen him ſince I made the laſt operation upon his eyes.

John Smith, of Chatham, about fifty-five years of age, could not ſee to read, but could find a road: I treated by electricity, as in the other caſes, for ſeven or eight days, when his ſight was rendered ſo tranſparent that he could read the ſmalleſt print; and he was about to ſend the glad tidings to his family: in the preſence of one of his neighbours, he called for a fine needle and thread, that his neighbour might be a witneſs to his wife of the abſolute betterment he had received; when he, without any difficulty, threaded the needle.

George Alger, of the ſame town, aged about fifty-five years, was relieved from an opacity of viſion, about the ſame time.

A wife of Mr. Carter, Saliſbury, ſtate of Connecticut, was nearly totally blind of a gutta ſerena, and that of the worſt kind: her eyeballs red and inflammatory, were, in about thirty days, reſtored almoſt to their former ſtate of tranſparency, eſpecially one of them; (for the other eye was damaged, by too much air on the ſide of her face, at a particular time) ſhe could diſtinguiſh a man fifty or ſixty rods diſtance; but my buſineſs in other places was ſo urgent, I could tarry with her no longer: I left her with a view of completing the buſineſs at another time; but, notwithſtanding all the caution I could give her to avoid the air, ſhe was perſuaded by ſome of her neighbours to ride a few miles; ſhe gave way to their importunity, rode out, took a very bad cold, and almoſt loſt her ſight again. I have mentioned theſe diſaſtrous effects of taking air too ſoon, that others in the ſame ſituation may learn to fear and avoid ſuch deſtruction.

The wife of David Ring, of Chatham, and daughter of Mr. Bunker, packer or inſpector of proviſions, of Hudſon, and on the river of that name, twenty-eight years of age, could not ſee to read at twelve years old, by reaſon of dimneſs of ſight; ſhe was totally blinded. I uſed the gentle ſhocks upon her eyes, a few days, and ſhe began to diſcover objects pretty clearly; ſhe could obſerve the ſhadow of a cat on the floor: but getting poſſeſſed of the notion that ſhe muſt ride to Hudſon, ſixteen miles, on a pleaſant day, to viſit her friends, eſpecially a ſick ſiſter, was met, as ſhe entered the town, by a violent ſtorm of thunder, wind and rain, all in her face; very ſoon a cataract fell into one eye, and with much difficulty, I was afterwards enabled to keep the other eye in a ſtate whereby ſhe could perform buſineſs about houſe.

Theſe women being at home in their own families, as ſoon as their ſight was bettered, could not be reſtrained from taking too much light, from viewing objects too minutely, were poſſeſſed of too much attention to buſineſs; which they ought totally to neglect. But in ſpite of all theſe obſtacles, they received betterment, as above deſcribed. I was myſelf reprehenſible, in ſome of the firſt inſtances, in not guarding ſufficiently againſt light and cold, by which means my patients ſometimes ſuffered. To be plain, it was long before I could learn the abſolute neceſſity of avoiding the moſt trifling degree of air or coolneſs; and after I had been ſufficiently taught it myſelf, I have often found it difficult to convince my patients of the truth of it. They have commonly learnt it by experience.

When gutta ſerena is induced by an opacity, or vitiated ſtate of the aqueous, vitrous and chryſtaline humours, thereby intercepting the refractory rays of light upon the retina; the gentle ſhocks, paſſed upon the organ of ſight, clarify theſe humours, and render them tranſparent, and ſo admit the rays of light to fall upon the retina, and viſion is reſtored; but when by inflammation, or the over-action of light upon the optic nerve, there is an inſenſibility, torpor, compreſſion, or a decay of the optic nerve, the caſe is more difficult, and it may, in ſome inſtances, be impoſſible to reſtore viſion, eſpecially from a decay of the nerve; and perhaps the optics may be ſo wounded by a violent inflammation, as to prevent a reſtoration to ſight.

In electrifying for this ſpecies of blindneſs, Dr. Cavallo directs that the ſhocks be paſſed from the back part of the head, to round about the eyes: at firſt thought I could not approve of that direction of the ſhocks, becauſe the ſhocks determine the fluids in ſome degree, and the morbid affections, in the ſame direction in which the ſhocks are paſſed upon the ſyſtem: but when I conſidered that the evacuations from the head were in the fore part of the head; and that, notwithſtanding the quantity of humours might be increaſed in the firſt inſtance, about the eyes, &c. yet they were driven towards their proper evacuation, and might be ſooner voided, than they could be by a contrary direction of the ſhocks.

My method hath been to paſs the ſhocks moſtly from the forehead, and round about the eyes, to the feet, in order to propel the opaque particles downward from the humours of the optics; which alſo tends to throw them

off by external evacuations. But ſhould I in future paſs the ſhocks through the head, or ſome of them, I ſhall paſs them from the back part to round about the eyes.

The number of ſhocks, in one day, may be from eight to twenty; but in general they muſt be ſuch as I have deſcribed to be the gentle ſhocks.

I have uſed the aura in thoſe caſes; but could not diſcover any benefit from it. Drawing the electric ſpark from round about the eyes, may be of ſome benefit; but I ſuppoſe the gentle ſhocks ſupercede the neceſſity of that operation.

Sometimes the viſion will become ſo ſuddenly tranſparent, as to make a dark room neceſſary for the patient; and to be continued in it in the ſame manner as for couching or extracting of a cataract.

I am not able to determine, from all my practice in electricity, and treatment of many more caſes than thoſe I have mentioned, whether any caſe of total blindneſs, by gutta ſerena, can ever be ſo removed as to obtain original clearneſs of viſion. So many improprieties and accidents have attended almoſt every caſe in which I have been employed, that I have not had an opportunity of aſcertaining the ultimatum of a fair proceſs. But this I am able to aver, that I have uſed it in no caſe of gutta ſerena, (except one for ſix days, blinded by a tremendous inflammation in the head and eyes for months) without inducing ſenſible betterment, and that in proportion to the length of time I have attended.

The loſs of ſight, to any individual, is a loſs ſo irreparable by any thing elſe in creation—the ſituation ſo gloomy and comfortleſs, that I have ſpared no pains on this topic, to reflect all the light in my power, to facilitate and familiarize the ſubject, in hope that it may be (and I am perſuaded it will be) a laſting benefit to my fellow-creatures. All that remains to be urged, in this caſe, is, that people take warning, by the inſtances above recited, of the imprudence of people, when uſing electricity in ſuch critical and important caſes—that they learn wiſdom from others experience in folly. To be ſhort: during the time of electrifying the eyes, and for ten or fifteen days afterwards, the head and face muſt be kept in a gentle perſpiration, or blood-warm. In order to prepare the patient to bear the air ſooner, you may give a few doſes of elixir vitriol, the bark, &c. and waſh the head and face in brandy frequently.

N. B. It will be obſerved, that I have denominated that blindneſs induced by great age, to be a ſpecies of gutta ſerena; and, by the way, this kind of blindneſs is moſt eaſily removed. Obſerving this circumſtance, in the courſe of my practice, hath cauſed me to ſay, that it was probable the time would arrive, when electricity would be in ſuch general uſe, and ſo well underſtood, that there would be no

uſe of ſpectacles—that electricity would ſupercede the neceſſity; and that blindneſs by age would not, or need not be known.

Cataract.

The electric ſhock cannot remove a cataract, eſpecially a confirmed one: I have tried the utmoſt of its uſe; and could do no more than to ſeparate it, and break it into particles, by giving ſmart ſhocks through the ball of the eye. Theſe particles would revolve in the eye into different attitudes, and gleams or ſparks of light would occaſionally dart through the floating particles; but they could not be diluted and diſſipated: But, with a prudent uſe of the ſhocks, they may ſometimes be helped a little, eſpecially recent ones. I have made a good degree of betterment of one of eight years ſtanding: but very few can receive any benefit from the ſhocks, after the diſorder is more than one year old.

There is, undoubtedly, ſometimes a degree of gutta ſerena accompanying a cataract; and perhaps thoſe that may be relieved, are relieved by removing what partakes of the nature of gutta ſerena only. But it is, nevertheleſs, expedient to try the effects of a judicious treatment by the gentle electrifications, in all caſes of cataract. There is no doubt but that an electrification will prevent their growing worſe, and will remove any degree of opacity that depends on gutta ſerena, accompanying cataract.

But the greateſt bleſſing accompanying electricity, in removing a cataract, is, in ſuppreſſing the inflamation that ſucceeds to the operation of couching or extracting of the cataract. This, however, I have not put to actual experiment: but, from its known effect in ſuppreſſing inflammation, under the application of ſeveral cauſtics upon a film, and of its ſuddenly removing any ſettled inflammation in the eyes, as well as in any other part, we cannot help knowing that it muſt be of ineſtimable utility in ſuppreſſing inflammation, which ſo often and ſo fatally ſucceeds to the operation of couching or of extracting a cataract from the eye.

Not only the ſucceſs of the undertaking is ſuſpended upon this anti-febrile ſpecific; but alſo the principles of humanity dictate, that, as the eaſe and happineſs of the patient are alſo ſuſpended on the ſame means, they cannot be neglected with impunity. Who would ſuffer, for coffers of gold, what ſome have ſuffered, by inflammations that have ſucceeded to the couching of a cataract! This ſuffering may now be uniformly avoided, by any one who will be at a little trouble in the uſe of the gentle electrifications, and be careful to avoid that rock of deſtruction, cool air, on which ſo many ſhipwreck themſelves, when under the uſe of electricity.

In the ſurgical operations upon the cataract, I ſhall recommend the treatment by electricity, to be made in the following manner, viz. Before the commencement of couching, let the patient be electrified two days: at leaſt fifty ſhocks ſhould be given each day; and as to their force, it muſt be adapted to the ſtrength of the patient: If of a firm, robuſt body, let the ſhocks be ſtrong. Paſs ſome from the ſides of the neck, and the reſt from all parts of the head, to the feet. The ſhocks on the neck ſhould be the ſtrongeſt: they are eaſier ſuſtained by the patient in that part than in the head. This previous electrification will make it neceſſary that the operation be made in a very warm room, otherwiſe the patient will take cold while the operation is performing, which would be very detrimental. The next day after couching, paſs ten or fifteen ſhocks from the ſides of the neck to the feet: On the ſecond day, you may paſs the gentle ſhocks from all parts of the head and face, as for inflammatory eyes, to the feet. Let this be continued a few days, as occaſion may require, till all danger of inflammation is paſt. The covering of the head and face may be removed by ſlow degrees, after a few days; and aſtringents may be uſed, and the head and face waſhed with brandy: all which will enable the patient to bear the cool air the ſooner.

Fiſtula Lachrymalis.

THIS muſt be treated much after the ſame manner as inflammatory eyes, with reſpect to the direction of the ſhocks; only it will be proper to paſs many of the ſhocks from the back part of the head to the part between the eye-brows, and all round the eyes: This is intended to remove the obſtructions, and reſtore the quality and due ſecretion of the lachrymal. A few days electrifying is ſufficient to remove this diſorder, if the patient keeps ſufficiently warm; but it will never cure, as I have experienced, if the patient repeats the colds upon it.

Involuntary motion of the Eye-lids.

THIS trifling affair, any one may remove, who doth not wiſh to retain it: The method will be, firſt, to cover warmly, and then paſs twenty light ſhocks daily from juſt above the eye-brows to any part below the head: or it may be cured by extracting the electric ſpark from the eye-lids; but the gentle ſhocks are quicker in effecting the cure.

I have always been able to remedy this little inconvenience in about ſix or eight days, by giving fifteen or twenty light ſhocks each day, and keeping the head and face well ſecured from the cool air.

Hemorrhage.

BROWN's elements of medicine contend, that emiſſions of blood proceed from debility; even the emiſſion from the lungs, in a peripneumony, doth not take place previous to the inducement of indirect debility: and ſo he will have it altogether to proceed from debility, either direct or indirect. I believe that emiſſions proceed from relaxation and extravaſitation, in what is called flooding; and from extravaſitation and redundancy in the head, from the noſe, and in the cheſt, &c. without inflammation; and from inflammation and redundancy in fever and peripneumony. (Vide fever, chap. 3, page 97.)

By knowing the nature of any particular ſpecific, and at the ſame time how the diſeaſe is affected by it, we may by thoſe means be aſſiſted in forming a judgment of the diſeaſe itſelf: And, after having minutely aſcertained the effects produced by the electric ſhocks, I have been aſſiſted in forming a judgment of the nature of ſome diſeaſes more accurately than could have been done without the knowledge of electricity. Other ſpecifics afford the ſame ſource of information. Thus it is well underſtood, in modern times, that opium is a tonic, and affects the animal functions, by inducing tone and tenſion; that it obtained the name of ſedative in the days of ignorance; that it rouſes the circulations, and ſtrengthens the veſſels to embrace their fluids in due degree of force. The reſtoration of this medium of tenſion and action, proves an ample ſpecific or remedy of emiſſions, or of hemorrhage from the uterus, &c. Hence it is evident that the cauſe was relaxation; and, undoubtedly, that is accompanied by extravaſitation. That it is attended, and promoted partly by extravaſitation, is very evident, from the conſideration that the electric ſhocks do aſſiſt in reſtraining an exceſſive hemorrhage, of this deſcription: this can only be done by the ſhocks, on the principle of an exiſting extravaſitation. This extravaſitation may as well be called redundancy, taking place through a laxity of the part whence the hemorrhage proceeds. It is counteracted by the tenſion of an opiate, by rallying the action of the whole vaſcular ſyſtem, and ſo prevents the fluids from crouding too forcibly upon this laxed portion of veſſels, which veſſels have, in a degree, loſt the power of reſiſtance, of propelling on, and of retention. The electric ſhocks impart a partial relief, by reducing the ſyſtem to an equilibrium and tenſion. In ſo far as this equality of action is induced in the veſſels, in the ſame proportion, or nearly ſo, will the flux be reſtrained.

From what hath been advanced, it is evident that both the ſhocks and opium may be uſed to advantage, in this kind of hemorrhage: And it is equally evident, that the ſhocks ſhould be applied before the opium; not only becauſe the ſhocks would, if given laſtly, deſtroy the good effect of an opiate, as well as of any other tonic; but becauſe the ſhocks, paſſing through the other parts of the veſſels, avoiding the uterine, ſo as to reduce their action, and bring them as nigh as may be to a par of action with the parts of the uterine veſſels, will, as I think, facilitate an agreeable action of an opiate, and anſwer a very valuable indication of cure.

N. B. The ſhocks are recommended by Britiſh electricians. Emiſſions of blood from the head, in the cheſt, &c. without inflammation, or an increaſed action of the heart and arteries, is a circumſtance diſſimilar to the former caſe: This is undoubtedly a redundancy on the part whence the emiſſion proceeds, formed on the principles of an extravaſitation, or an inequality of the circulations. This is proveable, from the conſideration of their being invariably cured by the electric ſhocks only, and that very ſuddenly too: but when the ſhocks firſt ſpring the veſſels, the blood that is ready to be diſcharged ſpirts immediately out. But the blood being now attenuated, and every paſſage equally acceſſible, an eaſy circulation, and an equality of circulations, immediately ſucceed; and, conſequently, there is no more preſſure, no more local retention, and finally no more hemorrhage from the part.

In theſe caſes, and on theſe principles, I have cured the bleeding from the noſe, by paſſing ſmart ſhocks from the ſides of the neck to the feet, and light ones from the forehead to the feet.

In the ſame manner I have invariably reſtrained bleeding in the cheſt, (I care not what part) by paſſing ſhocks through the cheſt, and every part of the ſyſtem.

N. B. Caſes of ſudden ſtrain, or wound by ſome accident, may require ſome other aſſiſting means: but the ſhocks, in all caſes, are a prerequiſite, eſpecially if the hemorrhage cannot be reſtrained without it. To make this familiar, I will relate an occurrence at Ballſton pool.—A young man, riding down a hill in a waggon, was, by ſome accident, plunged from the fore part of the waggon to the ground, forward of the waggon, and two of the wheels ran over him, from his ſhoulder on the right, to his hip on the left ſide. Being nigh me, he was brought to my houſe, badly wounded, and hardly able to breathe, in great pain through his whole body. He was laid on a bed, nigh to the machine: I immediately paſſed fifty or ſixty ſhocks through every part—gave him complete eaſe in his body, in every part but in his left hip; the bone of which being bruiſed, there remained a trifling pain. By ſome means his family doctor was ſoon there, and had orders to bleed him. I told him it would do no good; for the ſhocks had relieved him in every part, except the wound in the hip-bone; and the man declared he was eaſy in every part but his hip. But the doctor had orders to bleed, and wiſhed to do it, if I had no objection. I aſſented. He let blood; it ran freely, but not forcibly. He unbound, and exclaimed, I am miſtaken: I expected there would be difficulty in ſtopping the blood after taking the ſhocks; but it ſtops eaſier than uſual. I replied, this

is one uſe of the ſhocks, to abate the force of the veſſels.

I ſhall ſubmit to the opinion of my reader, to determine, whether it is, or is not expedient, in difficult caſes of ſtaunching blood, firſt to reduce the action of the arteries and veſſels univerſally, and then to adminiſter the uſual ſtiptics.

The emiſſion of blood in a peripneumony, and in the yellow fever, or that fever which has threatened the depopulation of New-York, Philadelphia, and ſome other of our ſea ports; proceeds from a cauſe diſſimilar to all the other caſes.

With much deference to Dr. Brown's opinion, I am perſuaded that the emiſſions of blood, in either of the above caſes, do not wait the arrival of indirect debility; neither doth debility conſtitute any part of the cauſe. Juſt the contrary of all this is true: the increaſed action of the heart and arteries—their tremendous enginery, by which the blood is forced with violence upon the capillary veſſels, and from which it cannot ſo readily recede—and they being by ſuch a proceſs greatly diſtended, they finally uncap, and emit their fluid: Rarifaction may alſo facilitate their freedom of emiſſion; but rarifaction doth not form any eſſential part of the cauſe of this emitting blood, in theſe caſes.

When indirect debility arrives, the whole ſyſtem partakes in it, and it is likely to be equal in the whole. It would abate the action of the arteries upon the capillaries, in proportion as it abated the power of reſiſtance or of retention in the capillaries. Hence, the proper ſtiptic, in theſe caſes, is that which takes off the tenſion of the arteries and veſſels univerſally. This ſtiptic is now diſcovered: hence, we hail thee, adorable *Electricity!* late arrived, or lately known, the friend of human life—with celeſtial bleſſings ſurcharged, of late deſcended from on high, to bid the dying live, the ſick revive, the pain'd to reſt in eaſe, the blind to ſee, the lame be whole—to lead man on to lengthen'd age in eaſe—to be the ſiſter bleſſing of that grace, deſtined in due time to fill all hearts, and reign triumphant through our diſordered world.

The ſtiptic now appears to be electrical fire, by art adminiſtered in due form and juſt degree: this is the agent that will give ſoftneſs and mildneſs in the action of the veſſels, and conſequently forever prevent the emiſſion of blood in fever and peripneumony. The ſhocks ought to be uſed in the firſt ſtages of a fever, before any veſſels uncap, as the fluid may be diſcharged into ſome cavity, whence it cannot be eradicated, and muſt mortify or putrify, and ſo prove fatal. Alſo, the patient can more eaſily ſupport the action of ſuch ſhocks as may be neceſſary to reduce the exiſting tenſity of the vaſcular ſyſtem.

Hemorrhoids.

HEMORRHOIDS, or the piles, will appear to be increaſed on the firſt electrifications: but this appearance is produced in the ſame manner in which it is produced in electrifying for cure of an ulcer, emiſſion of blood, &c. It is peculiar to the ſhock, in the firſt inſtance, to promote any unnatural diſcharge, and which it will ultimately reſtrain. Give ſix or eight ſhocks daily through the part, until well; which, if you keep warm, will be but a ſhort time.

Ulcers and Abſceſſes.

WHENEVER medical electricity ſhall be generally adopted in the practice, ulcers and abſceſſes will be rare as comets; but, for the preſent neceſſity, we muſt be ſomething explicit. Whenever any tumefaction becomes purulent, it muſt be opened by the lancet, that the pus may be voided: after this is done, the ſhocks paſſed through the part, will immediately throw off and diſperſe the remaining morbific matter, reduce the tumefaction, and contact and heal the part.

All open ſores, on the ſurface, will be clarified and healed, in the ſame manner, more ſurely and quicker than they can poſſibly be by any other means on earth.

Internal ulcers and abſceſſes, when once they are open and begin to diſcharge, are clarified and healed, in the ſame manner as thoſe on the ſurface; and, what is of no ſmall importance, an abſceſs will never form a ſecond time, no, not in any degree, after the firſt electrification: Pus may be formed, and, if that be the caſe, the ſhocks cannot give final relief, until the maturation is diſcharged; after which, it forbids, with omnipotent authority, a re-commencement of purulency.

In treating of this caſe, it may be uſeful to relate a particular inſtance of the effects of the ſhocks on an internal ulcer or abſceſs. Moſes Lues, innkeeper in Galway, county of Saratoga, was, during my abſence from the place, afflicted with abſceſſes in his left ſide: they formed and diſcharged, eleven or thirteen times, I have forgotten which, in the ſpace of about two months; the greater part of which time, he was exerciſed with great pain, and became very inflammatory: he finally got through it for that time; but his health was very imperfect, and he was looking forward, with evident marks of deſpair, to the period when they would re-commence, and prove fatal. By this time I was returned to the place; and, being informed of his ſituation, I adviſed him to uſe the gentle ſhocks, as a preventative. He ſaid that nothing had ever done him any good, neither did he expect any relief from any one. I importuned him in vain, till ſome time in the winter, about ſix months from his former ſickneſs, the pain began again in the part of

the former abſceſſes: but he would not yield to me, till the pain and deſperation obliged him to it. As I very much reſpected the gentleman, I was very glad of having an opportunity of preventing his ſuffering, if not of ſaving his life.

As the abſceſs was forming in his left ſide, nigh the diaphragm, I directed the ſhocks from the left, through the abſceſs, to the right ſide, about ten light ſhocks: the conſequence was, ſoon after, that he coughed, and brought up a gill of coagulated blood, and the pain abated. Some hours after, I paſſed about the ſame number of ſhocks in the ſame direction as before: ſome time after, when he had retired to bed, he again coughed; we ran to the bed, and he brought up about half a pint of bloody matter, as before. This diſcharge was pleaſing to me, and accepted as ominous of a ſpeedy reſtoration; but Mrs. Lues was very much alarmed, fearing he would bleed to death. I obſerved, that it was much better to throw that matter off, before it increaſed to four times that quantity, became fœtid and purulent, and induced a febrile ſtate, as it had done before; that now the part affected, would be cleanſed and healed, without any ſuffering to Mr. Lues. This all proved true: Mr. Lues had no more pain, no more diſcharge, excepting a trifle, that would ſometimes diſcolour his ſpittle, when he coughed; but this appearance was but for two or three days. To be brief, he was reſtored to ſoundneſs, and has remained well for ſeveral years ſince. *Query*—Is there any thing elſe on earth, that could thus have diſcharged that forming abſceſs, and clarified and healed the part with ſuch facility and diſpatch as the electric ſhocks?

My method of electrifying for ulcers, or abſceſſes, hath been, to paſs the ſhocks through the part affected; and it is often uſeful to paſs them through every part of the ſyſtem: They muſt alſo be repeated daily, or once in two or three days, till ſoundneſs is reſtored in the part affected. I have mentioned the uſe of electricity only; but I do not mean that any aſſiſting means ought to be neglected; unleſs for the proof of electricity, you may uſe it without conjoining any aſſiſting means for a time, till your opinion concerning its uſe may be confirmed.

Rickets.

Almost every page affords ſome evidence of the uſe of gentle electrification, to remedy or prevent the rickets in children, as it is chiefly in youth that this diſorder prevails. All that hath been advanced of the various effects produced by the ſhock, in affecting the fluids and action of the veſſels, ſerves to prove not only the abſolute certainty of its ſalutary effects in this diſorder, which ſo often proves the deſtruction of children, but argues the cruelty of omitting the only infallible remedy

of this diſeaſe. How phyſicians have overlooked electricity, in this caſe, I cannot conceive. Every preſcription, indirectly, owns electricity its ſuperior: they preſcribe riding, the cold bath, various geſticulations, &c. to move the circulations; but cannot, or will not ever think or ſpeak a word of the electric ſhock: that muſt not be mentioned; no, that is to be conſigned to oblivion, or to ſport away a leiſure hour.

Whenever any unnatural oſſification hath taken place, I know of no cure for that: but to prevent any increaſe thereof, and to remove a ſtagnation or a redundancy of cartilaginous matter, to attenuate the fluids generally, and open all the minuteſt circulations and ſecretions every where, and to eſtabliſh a due degree of action, eaſy and in perfect conformity to the laws of animal life and health. To do all this, let the child be electrified (but gently) in every part, once in two days, about fifteen ſhocks at one time: let this be continued fifteen or twenty days, if need be; and with the help of a careful nurſe, to keep the child warm, it will receive all the benefit that man can give.

Locked Jaw or Joints.

I once offended a gentleman of the faculty, by ſaying the electric ſhocks were the moſt infallible remedy of this ſpaſmodic affection. He ſaid he knew all about it; he had tried thoroughly, and it would not anſwer any good purpoſe: but he thought it did more hurt than good; it was more difficult to reſtore a locked jaw after being electrified, than before. This declaration was enough to ſilence any one, that knew no more about the buſineſs than he did: but I aſked the doctor how many ſhocks he gave the patient? he ſaid about twenty. Perhaps you did not give them ſufficiently ſtrong. They were very ſtrong. Did you cover him warmly about the head and face? No, there was no need of it. Was the weather warm, or cold? Cold. I replied, you have convinced me that you gave him no relief by ſuch a treatment; there was more danger of taking life, than of preſerving it, by uſing electricity in a manner ſo inconſiſtently. However, this is but one error: the whole practice in electricity hath been rendered abortive, by errors on every hand.

In order to obtain relief, by the electric ſhocks, in locked jaw or joint, the mode of treatment muſt be conducted on principles intirely different to what is above related. The ſeat of ſpaſm, whether it be the jaw or any other part, muſt be very warmly covered, previouſly to the giving of a ſingle ſhock: the chains may then be applied to the patient in ſuch a manner, as to conduct the ſhocks through the ſeat of the ſpaſm. The intention of the ſhocks is, not to attenuate, not to dilate the veſſels, not to induce any debility, but to promote the greateſt frictional heat poſſible:

This muſt be done by the very gentle ſhocks, and in great numbers; they muſt be continued, with but little intermiſſion, until the ſpaſm is removed. The wires ſhould be moved, once in thirty or forty ſhocks, a little ſpace, leſt they bliſter the ſkin; they need not be moved more than one inch at a time.

It is of uſe to electrify throughout the whole nervous ſyſtem, in the ſame manner; but the ſhocks may be a little ſtronger, and leſs in number than on the local affection. This univerſal friction, will have the effect to raiſe the local to a higher degree, and haſten the cure.

Theſe operations muſt be alternated, and continued for hours, unleſs the ſpaſm yields in a ſhorter time. A high and ſteady degree of warmth muſt be conſtantly obſerved, during the whole operation, till the cure is effected, and for days afterwards; but leſſened by degrees. Theſe rules being obſerved, will never fail to reſtore a locked jaw or joint in a few hours, at longeſt. I have reſtored a locked joint in thirty minutes, by fifty gentle ſhocks.

Theſe preſcriptions and rules, carefully attended to, will extricate this moſt bleſſed of all the means of health and life, from the contempt which ſome people, who know little or nothing about it, are diſpoſed to caſt upon it.

In the inſtance above cited, of treating a locked jaw by electricity, there was every impropriety attending the proceſs: the ſhocks were much too ſtrong; the part uncovered;

the patient inſtantly took a cold on the part; there was no friction promoted: All that was effected, was an increaſe of debility; and to conſummate all miſchief, a deadly cold inſtantly ſtruck the part. If any one will not believe that a cold will ſucceed ſo ſuddenly to the ſhock, they may be convinced of it, any time, in a cold day eſpecially: Go into a cold room, with juſt covering enough to keep you from ſhivering; there take eight or ten ſmart ſhocks; then wait a few minutes, and ſee if the air, that before was tolerable, now feels like a cold bath: But you may buy your faith too dear.

Excepting it is determined to try the power of electricity only, it will facilitate the cure to conjoin all the aſſiſting diffuſable ſtimulants; and it may be abſolutely neceſſary, in extreme caſes of difficulty, leſt the patient be expoſed to longer ſuffering than otherwiſe he might be neceſſitated to endure.

Bruiſes, &c.

BRUISES, internal and external, are helped more and quicker, by the electric ſhocks, than they can be by bleeding, and all the other internal and external applications whatever: There is no mean yet diſcovered, that hath half the power of preventing coagulation, ſtagnation and concretion of the blood.

It is of ineſtimable value for internal bruiſes, and would undoubtedly ſave life in ſome ſuch caſes, when all other means would fail. When, in ſome certain portion of veſſel or veſſels, the wound has nearly taken off all the action of the part, and when no other means could be able to prevent a concretion and mortification of the blood; yet in many ſuch caſes, the electric ſhocks, frequently repeated, would be likely to prove effectual. They muſt be frequently repeated, becauſe the weakened veſſel or veſſels will be diſtended, by a retention of blood, through loſs of tone and ſtagnation: the ſhocks being frequently repeated, will prevent this ſtagnation and redundancy in the part wounded; and opiates will aſſiſt in reſtoring the action of the weakened portion of veſſels.

Moreover, the ſhocks will moſt effectually attenuate the concreted particles of blood, prepare them for re-aſſumption in the circulations, and prevent their ſending off any ramifactions to the neighbouring veſſels, which might lay a foundation for ſome other morbid affection, in various parts of the ſyſtem. There is proof ſufficient of the power of the ſhocks, in ſeparating, attenuating, propelling off, and diffuſing from the part wounded, the coagulated, clotted particles of blood. This hath been noticed, (vide page 142.) When the wound or bruiſe hath not diſcoloured the ſurface, or when no coagulations have been viſible on the ſurface, yet will it immediately appear, after a few ſhocks are paſſed through the part: It will be diffuſed through the muſcle, from the part wounded, in the ſame direction in which the ſhocks are paſſed. But theſe appearances are not always viſible; it depends, as to its making any viſibility on the ſurface, on the part bruiſed, and the quantity of coagulated blood in the part: But its appearing ſo ſuddenly after the ſhocks, when the ſituation and circumſtances of the bruiſe will admit of its ever appearing on the ſurface, before it is abſorpt in the circulations, proves that ſingular and very valuable effect produced by the ſhocks of this ethereal fire, on the fluids generally. This one effect of the ſhocks, being known, would juſtify the moſt ſerious and ſcrupulous enquiry into a thorough inveſtigation of the ſubject of medical electricity.

Let me look up to the man of abilities, and aſk what may be done, or rather what may not be done, by an agent, ſo exceſſively diffuſable and fermentative? Is life and health of any importance to mankind? And, is not this medicine, (which, like Aaron's ſerpent, ſwallows up all the reſt) of any importance? Say, ye whoſe ken penetrates the receſſes of nature's laws, how far doth this ethereal fire exceed all the noſtrums and celebrated ſpecifics on earth? How doth it eclipſe them, as the luminary of day eclipſes the dimmeſt ſtar? Will you have fevers to follow a judicious uſe of this ethereal fire? You will have fevers, then, without a checked perſpiration, with an eaſy and voluntary flow of perſpiration, with a due mixture of all the fluids, with a due and regular action

of all the ſecretions, without redundancy, without extravaſitation, and finally, without ſtricture or tenſion, without any increaſed action of pulſation. Then tell me, ye whoſe buſineſs it is to ſpeak evil of what you underſtand not, how will you work up a fever in the human body under theſe circumſtances? You cannot, with all your dexterity, form a dropſy. How will you raiſe a tumefaction, or collect and retain a body of morbific humours in a part, ſo as to form an abſceſs, or an ulcer, before this fermentative agent? Neither can you, if you ſtarve in conſequence of it, any ſooner conſtitute a peripneumony, or an inflammatory rheumatiſm, than you can a fever: This agent defies them all, and many more diſeaſes. You cannot conceive of coagulation and obſtruction, ſo as to hatch up a pleuriſy in any form, before the electric ſhocks. Who, then, ſhall go about to obliterate this friend of human life, and dare to blot it out of view? Will you conſign to death, unheard? Her advocates have faintly ſpoke from Europe;* you liſtened not;

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* *From Europe, &c.* Dr. Weſley, ſpeaking of electricity, expoſtulates, ſaying, "I cannot but intreat all thoſe who are well-wiſhers to mankind, to make full proof of this; certainly it comes the neareſt to being an universal medicine, of any yet known in the world."—(Vide Primitive Phyſics.) And again, in his concluſion upon medical electricity, he ſays, "Before I conclude, I would beg (if it be not too great a favor) from the gentlemen of the faculty, and indeed from all who deſire health and freedom from pain, that none of them would condemn they know not what; that they would

their voice was too weak to gain an audience. She wakes Columbia's child to plead her cauſe before the auguſt tribunal of the human race. This advocate is friendly to the cauſe of truth, a true philanthropiſt; but, Moſes-like, he is ſlow of ſpeech: Sympathizing in man's ill, and fired with zeal to give him eaſe, his client's ſummons he obeys, harneſſed with truth in every page; her pictureſque he draws, in lines ſo fair and obvious to view, that none can miſtake—"'Tis errors abſolute defeat." He calls on man, the jury univerſal, unempannelled—Say, ſhall merit ſo extenſive, deeds benign, to miracle akin, be pronounced accurſed? and, pregnant with bleſſings for you all, aſks but your leave to give freedom from pain, to ſee long life, if life before be not deſtroyed, and quite a miracle required to reſtore it. Live it will, in future days, to bleſs the wiſe, who

know and prize her worth; and all the queſtion is, will you be bleſt to day?

I know not how to addreſs myſelf to mankind, that I may perſuade them to their own good. I doubt not, but many will be convinced of the abſolute benefit to be derived from electricity, who, notwithſtanding, will need other arguments to perſuade them, that "life is more than meat, and the body, than raiment." They are ſo engaged in lucrative purſuits, that all conſiderations of preſerving life and health are poſtponed, till the fatal moment arrives in which both are loſt.

But I have one or two more caſes to treat of, before I cloſe this chapter; in ſpeaking of which, I ſhall ſtudy brevity.

Nerves contracted.

Recent contractions of nerves are generally very eaſily reſtored: but thoſe of years ſtanding, I have not been able to cure entirely; ſometimes they would be helped a little, and ſometimes no good could be done them by electricity.

But contractions of a few months continuance, I have always been able to remove without any difficulty.

My method of electrifying, in ſuch caſes, has been to paſs the ſhocks directly upon the nerves contracted, in their full length. I have given from twenty, to ſixty and ſeventy a day; and, the perſon being kept very warm, they

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hear the cauſe before they paſs ſentence; that they would not peremptorily proceed againſt electricity, while they know little or nothing about it," &c. &c.—(Vide Beauties of Weſley, page 154, 155.)

Again—Cavallo's Medical Electricity has a quotation to a treatiſe written by Dr. Lovet, entitled Subtile Medium proved; in which the Doctor ſays, "The ſhocks to be uſed in medical electricity, ſhould be exceedingly light;" by which treatment, he hardly ever failed of curing, or at leaſt, of relieving his patients.

It appears by Cavallo, that Dr. Lovet had uſed medical electricity for a long time, and had diſcovered its uſe in inflammation. N. B. Lovet uſed light ſhocks only; but ſtrong ones are ſometimes beſt.

will generally relax quite faſt. When, by ſome wound, a perſon is obliged to ſit for a time in a contracted poſture, and the nerves become fixed and rigid, &c. the ſhocks are of great uſe to ſtraighten the nerves, and reſtore action in the nerves and tendons.

It is always the caſe, when bones have been broken, that the nerves and tendons have become inactive and torpid: but a few ſhocks, given lightly through the part, will reſtore action in one hour.

After bones have been broken, and put well to place, ſplintered and bandaged, the ſhocks paſſed through the part, will be of uſe to attenuate the fluids, to ſuppreſs ſwelling, to ferment the blood, and carry off the vitiated humours from the part. The wound will heal much ſooner.

But in electrifying in ſuch a caſe, if the patient hath not been uſed to taking of the ſhocks, and is afraid of them, let him (or her) take them lightly in a well part firſt, until they can take them without ſtarting; then let the gentle ſhocks be paſſed upon the part intended; which muſt be done without much ſtarting, leſt the bones be thereby miſplaced.

Sprain, or Strain.

A VIOLENT extenſion of the nerves, tendons or muſcles, in any part, is moſt commonly removed by the electric ſhocks. What is a little unaccountable, is, they will cure ſprains, or ſtrains, that are of many years ſtanding. A recent ſtrain is ſometimes relieved in one or two minutes, by eight or ten light ſhocks, given in the part wounded. Sometimes it is neceſſary to repeat the electrifications for ſeveral days. One thing is very certain; that is, if light ſhocks will not help it, I have never found any thing elſe that could: but there are ſeveral applications or ſpecifics, which, conjoined with the ſhocks, facilitate the cure. Keep warm.

Felon, or Whitlow.

AT its firſt appearance, having covered the part very warmly, paſs twenty light ſhocks through the felon: it may be neceſſary to repeat it once. If this fails, throw into an earthen, or ſome other pot, ſome hot embers; on theſe embers put a lock of ſheep's wool, well filled with greaſe; hold the hand on which the felon is, in this pot; draw a thick cloth over the pot, round your hand or arm, to keep in the ſmoke and heat: this will greatly ſweat your hand, eſpecially after taking the ſhocks.

Pains in different parts.

PAINS in the back are frequently cured by paſſing the ſhocks from a little above the ſeat of the pain in the back, to the fore part of the thigh, ſo as to bring the ſhocks deſcendingly through the part lame. Sometimes I have found it neceſſary to give the ſhocks pretty ſtrongly; and ſometimes ſtrong ſhocks are prejudicial, and light ones only will give relief: hence, the firſt ſhocks, in this and all other caſes, ought to be light, and increaſed in ſtrength as occaſion may require.

Pains or ſtitches in the ſide muſt receive light ſhocks through the part: if the pains ſhift from ſide to ſide, let the direction of the ſhocks be ſhifted as for pleuriſy, (vide page 111.) Sometimes the moſt imperceptible ſhocks only will prove uſeful.

When theſe pains are cauſed, (as they frequently are in females) by ſuppreſſion of menſtruation, they muſt have the ſhocks paſſed in the direction recommended in that caſe, (vide page 182.) That direction will avail to the removal of the cauſe; and the other ſhocks in the ſide will give temporary relief, until the original cauſe is removed, and the foundation of general health is eſtabliſhed.

Wounds, &c.

In whatever manner, or by whatever means, bones, nerves, tendons, or any part of the muſcles are wounded, by ſtrain, bruiſe, cut of edged tools, gun-ſhot, &c. the part ſo wounded is ſubject to irritation or inflammation, tumefaction, ſuppuration, &c. The propriety of uſing the electric ſhocks upon ſuch wounds, will appear from the conſideration of ſeveral

effects of the ſhocks, which have been already conſidered.

No one will doubt the propriety of reducing or of ſuppreſſing ſwelling, irritation, tumefaction, ſuppuration, &c. in ſuch caſes. Any one may know, that to purge the vitiated humours, and clarify the blood, is a ready way of healing a wound. If it is an open wound, it will be diſcharged, cleanſed and healed with ſurpriſing diſpatch. I think it would be of ineſtimable uſe in ſurgery, and that ſurgeons neglect their *ſummum bonum* in neglecting the uſe of the electric ſhocks, in many inſtances. Deep wounds in the fleſh, by gun-ſhot and otherwiſe, would be greatly aſſiſted by the ſhocks on the part: they will cauſe the wound to diſcharge freely; and, by ſuppreſſing irritation in all ſuch caſes, would facilitate a cure; and would frequently prevent a mortification by wounds.

But it is of importance to take notice of one circumſtance that will attend the electrification of wounds which muſt be uncovered for dreſſing; which is, that a cold will be taken in the part, unleſs much care be had to prevent it. It hath been noticed, that, from the effects produced on the ſyſtem by the ſhocks, there is no reſiſtance to a cold; that the blood is ſo attenuated, and propelled to the ſurface every way, the pores ſo dilated and expanded, that unleſs the covering induces warmth equal, or nearly equal to the warmth of the blood, the ſhocks do not produce the ultimatum of good effects, by reaſon of colds being thrown upon the blood: Hence, when a part is uncovered for dreſſing, it muſt be in air ſufficiently warm, by a warm fire-ſide, by ſurrounding blankets well heated, pots or pans of coals, &c.

Drowning.

I have never experienced the uſe of electricity in this caſe; I have only heard of its being applied for the relief of perſons in this circumſtance. Several years paſt, a phyſician told me of a ſurpriſing recovery to life, which was effected by electrifying the perſon; but I have forgotten the particulars.

It is, however, very certain, that the gentle ſhocks would go very far in inducing a recovery to action in the veſſels, &c. The frictional action of the ſhocks upon the ſolids, their elaſtic action upon the veſſels, would be the moſt likely to recover a perſon, of any thing, perhaps, in nature, that is yet diſcovered.

I will deſcribe the method that I ſhould purſue, or the manner in which I ſhould apply the electrical ſhocks, on this occaſion. After the perſon is taken out of the water, and laid on a bed, let woollen blankets be heated as much as poſſible, and wrapped round the body, next the ſkin; there ſhould be two or three thickneſſes at leaſt: It will require three or four blankets, that one may be continually heating by the fire, to change with the others, as they loſe their warmth, that the body may be kept continually warm. This being done in as ſhort a time as poſſible, without handling the body roughly by any means, commence the ſhocks without loſs of time: let many be paſſed from hand to hand, through the breaſt, and from the neck or ſhoulders to the feet—perhaps three or four hundred ſhocks, with little or no intermiſſion, unleſs ſigns of life ſhould ſooner appear: and likely it would be neceſſary to continue the ſhocks after ſymptoms of recovery; yea, undoubtedly, in order to ſuppreſs ſpaſm and convulſions; for they ſometimes are very terrible on this occaſion. Theſe ſhocks ſhould be ſo ſtrong, that a ſound man may feel them jar his elbows, when taken from hand to hand. But if the perſon is of a ſlender weak habit, they muſt not be quite ſo ſtrong. Some ſhocks ſhould be paſſed from the head to the feet. Theſe being continued a long time, and the body wrapped in hot woollen blankets, will induce action and life, if any thing but miracle can do it.

The ſhocks will move the blood, by ſpringing the veſſels; and the heat on the ſurface, joined with the frictional effects of the ſhocks, will rarify and ferment the fluids, and would give ſtrong hopes of ſucceſs, after a perſon has lain hours under water. It is ſaid, that, without theſe means being uſed, which are the moſt powerful by far, people who have lain ſix hours under water, have been recovered to life ; and ſometimes the means of recovery have been uſed two hours before any ſigns of life would appear. Surely, then, we need not deſpair of the reſtoration of one who has lain that time under water, when this agent, which is ſo well calculated to produce the deſired effect, is made a diſcreet uſe of.

It is very proper for a ſtrong perſon to blow his breath with all his might into the mouth of the patient, to diſtend the lungs ; then to depreſs them again by the hand. Let theſe operations be alternated and repeated from time to time.

Force nothing down the patient's throat ; but you may promote vomiting by tickling the throat with a feather.

Smoke of tobacco may be blown into the mouth, and ſpirits of hartſhorn applied to the noſe; and ſnuff may promote ſneezing.

When the patient can ſwallow, give a draught of warm water, with a table ſpoonful of muſtard mixed therein.

The ſhocks ſupercede the neceſſity of bleeding, rubbing the body, &c.

Life ſubſides, ſometimes, a long time before it becomes extinct. Wherefore, I would not utterly deſpair of ſucceſs with theſe means, even when a perſon has lain twelve hours under water, eſpecially a ſtrong perſon.

Perſons that have appeared to die ſuddenly, without diſeaſe, that have ſwooned or fainted, apparently into death, or have been hanged, or in a fit of apoplexy, may many times be reſtored to life, by ſuch a treatment ; alſo thoſe who have been ſtunned and apparently killed by lightning, may be reſtored in a few hours, by theſe means.

But when the action of the ſhock of lightning hath ruptured or burſt the veſſels, it is undoubtedly too late for any means to reſtore life, except the reſurrection power.

Suppreſſed Perſpiration.

WHEN the ſuppreſſion of perſpiration cauſes roughneſs and dryneſs upon the ſkin, perhaps ſome deficiency of the ſebaceous glands, or vitiation of the ſebaceous humour, producing diſagreeable ſenſations upon the ſurface, ſuch as itching, burning, ſmarting, &c. all of which may be remedied, by putting on warm covering, and electrifying one or two days.

Burns and Scalds.

DOCTOR WESLEY ſays, that the moſt deſperate burns, or ſcalds, are immediately relieved by paſſing a number of ſhocks through the part : I have found it to be a truth of no ſmall conſequence to mankind ; and was electricity of no other uſe, it appears, that its uſe to a man who has a large family of children, would juſtify him in being at coſt the of a machine (eſpecially a very cheap one, as I ſhall ſoon deſcribe) for his own uſe, ſeeing ſuch accidents are very frequent among children. The ſhocks ſtop the ſmarting of the burn or ſcald immediately, throw off the fire and reduce the irritation, cleanſe and heal the ſore. Let the patient be warmly covered, and ſoundneſs will be immediately, or very ſoon, reſtored. To keep the part from chafing, dip linen rags in linſeed oil, and apply to the part, or a poultice of roaſted onions.

Having treated of ſo many caſes, ſeparately, the proper method of applying it in any caſe, may be eaſily inferred. Suppoſe for a cough, electrify through the breaſt: for a cold, generally, electrify throughout the whole ſyſtem: for a ſtiff neck, through the neck, or rather down the neck. It is ſometimes of as much importance as life itſelf; I mean to women who ſometimes take cold in time of child-bed: the ſhocks will go far, in reſtoring deſperate caſes of this deſcription. The ſhocks muſt be lightly paſſed in every part, but eſpecially through the uterus. Their debilitating effects muſt be counteracted by opiates, or ſomething elſe, as ſoon as may be after the violent affections of the cold is removed.

I ſhall now make ſome general remarks, and conclude this chapter.

1. Let every perſon be warmly covered, before a ſingle ſhock is adminiſtered.

2. Uſe the electric ſhocks as ſoon as may be after the diſeaſe is diſcovered.

3. In all acute diſeaſes, call for the aſſiſtance of a ſkilful phyſician; there will almoſt always

be ſome other medicine wanted to co-operate with electricity. In fever, there will be, moſt commonly, an abſolute need of emetics or cathartics, of ſtimulants of one kind or another, of tonics, &c. of which the phyſician will be the beſt judge, who minutely obſerves the peculiar ſtate and habit of his patient.

But the electric ſhocks are an infallible remedy of fever, abſtractly conſidered; and if uſed in the firſt ſtages, very little of other medicine will be neceſſary, in many caſes and conſtitutions.

4. The ſhocks may be paſſed acroſs the ſyſtem, but ſhould never be paſſed aſcendingly, that is, from any part beneath, to a part nigher the head.

5. Strange appearances happen, after the firſt electrification, in ſome perſons: ſome will ſmell of brimſtone, who have not for a long time uſed or handled any of it; their ſweat, as well as their ſtools, will be ſcented as ſtrongly as might be expected if they had taken large internal doſes of ſulphur.

6. The ſweat of ſome people, when firſt electrified, will be glutinous, ſticky like wax; but this is peculiar to a ſtate of dimneſs of ſight, of gutta ſerena, and loſs of ſight by age: but this appearance ſubſides, as the ſhocks are continued, and a diaphoreſis is kept up.

Query—Are not the ſhocks an excellent preſervative of ſight?

7. People that I have electrified for ſuppreſſion of urine, have frequently aſked me, if electrifying did not induce an internal fever? They were very dry, they ſaid: theſe ſymptoms would continue for two, three, or four days. Theſe appearances I have imputed to a retention of the ſalts, of the microcoſmic or marine ſalt, or both perhaps, through a deficiency of the urinary ſecretions: the whole maſs of fluids imbibe an increaſed quantity; which, by the attenuation and fermentation of the ſhocks, are diſcharged from the glands in the mouth and ſtomach, into the ſtomach and inteſtines, and effect a ſenſation of dryneſs, in the ſame manner as drinking of ſea-ſalt and water. The ſweat, in this caſe, will partake of an increaſed degree of ſaltneſs.

There is another appearance, in this ſituation, that is worthy of notice: there is always an increaſed degree of denſity of the ſolids, very perceptible in the veſſels by laying your finger on the pulſe.

This laſt appearance I have aſcribed to the action of the marine ſalt upon the ſolids, in promoting this apparent denſity, in the ſame manner in which it is produced on the fleſh of animals preſerved in ſalt.

Query—Would not ſea-ſalt prove an excellent ſtiptic? I ſay an excellent ſtiptic, inaſmuch as it induces denſity without tenſity—would harden the capillaries, without exciting the arteries, by increaſing the degree of their tenſity, in a fever or peripneumony; and might prove very uſeful in that tremendous fever that pervades ſome of our ſea-ports.

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CHAPTER IV.

NOTWITHSTANDING I have developed the whole ſubject of medical electricity, and made it familiar to the weakeſt capacity; not only diſcovered its ineſtimable uſe in preſerving and reſtoring health and life—I had almoſt ſaid its omnipotent power over diſeaſes, eſpecially the accute kind; detected the former abſurd, inconſiſtent, pernicious manner of uſing this ſimple, powerful and bleſſed agent; fairly delineated and harmoniſed a ſyſtem of practical rules, to be obſerved in treating by electricity in almoſt all diſeaſes: yet if I drop the ſubject here, mankind are not likely to be much bettered by it. It is of ſmall importance to be informed of a medicine that would cure, but cannot be obtained.

Kind reader, I am determined to withhold nothing that ſhall be neceſſary to conſummate your happineſs, and make you maſter of the whole art of medical and practical electricity. You ſhall reap the full harveſt of all my labours, for nearly twenty years, on a ſubject that hath engroſſed almoſt my whole attention, and with ſuch unavoidable expences, as have prevented my being able to accumulate worldly pelf to myſelf.

During this time of practiſing medical electricity, I have diſcovered ſome improvements in the art of building the electrical machines, both in reſpect to their convenience and cheapneſs.

A thorough knowledge of building the machinery, and keeping them in repair, is now what is wanting to conſummate the whole buſineſs, and leave my reader maſter of the field. I know it would anſwer a more lucrative purpoſe, to reſerve this part to myſelf: But, as it would impede what I ardently wiſh for, viz. that all mankind were in poſſeſſion of the utmoſt knowledge and uſe of this precious mean of health, I freely forego any conſideration of ſelf-intereſt in the caſe, and participate the bleſſing communicated to mankind herein.

This chapter will contain, *inſtructions for building different conſtructions of machinery—of the inſolating ſtool and bed—how to make a malgam—natural imitation of lightning—how to extract lightning from the cloud—the uſe of lightning-rods—cautions in time of lightning—how to uſe electricity as a preventative*, &c.

I ſhall begin by deſcribing a machine, which may be built with about two dollars coſt, and a little work; and will be more convenient for medical purpoſes, by far, than any imported from Europe, although they coſt ſeveral guineas: but thoſe of the European conſtruction are built more for ornament than real uſefulneſs; for the moſt of them cannot be charged in the ſummer ſeaſon, when accute diſeaſes are moſt prevalent, and the machines are conſtantly moſt wanted for uſe. But my conſtructions will charge, more or leſs, any day in the year, by obſerving the inſtructions to be given for that purpoſe, in their proper place.

We will begin with the frame that is to ſupport the wheel, and the glaſs that is to be turned by the wheel: they muſt both be placed in one frame, with the wheel directly under the whirl that is put upon one end of the glaſs, that a band may be paſſed round the wheel and over the whirl of the glaſs: in this ſituation, the wheel, being turned by a crank, will turn the glaſs alſo, by help of the band.

The frame will conſiſt of two upright poſts, about five or five and a half feet high, framed into two blocks or ſills, about two feet and a half long: theſe may be five inches wide, and three deep, and framed together by two croſs pieces; the diſtance of the ſills muſt be determined by the diſtance of the two upright poſts; and the diſtance of the upright poſts muſt be determined by the length of the glaſs or cylinder, which is to be fitted to run between theſe upright timbers. This remark will apply in all caſes of conſtructing the frame. But I mean, in this cheap conſtruction, to uſe a common decanter for the cylinder, or globe, as it is called. We will ſuppoſe the decanter to be nine inches long, and we will ſuppoſe the wood-work, which muſt come upon the decanter, to occupy three inches more, which will make twelve inches; and two inches we will allow free, between the ends of the glaſs, &c. and

the upright poſts and timbers: the whole diſtance then will be fourteen inches. This will anſwer for almoſt any decanter; becauſe the wood-ſcrews that are to be paſſed through theſe two poſts, to ſupport the cylinder or glaſs, may be varied a little, by paſſing one ſcrew further through the wood than the other, &c. Theſe upright pieces may be formed out of a plank, two inches thick and four inches wide. The ſcrews that ſupport the cylinder are to be inſerted or paſſed through the upright poſts, within ſix inches of the top, on a right horizontal line, pointing directly to each other; theſe points mark the centre of the glaſs: juſt below the glaſs, ſo as to clear the ſurface of the glaſs one or two inches, a piece of wood muſt be framed acroſs into the ſide-pieces, to ſupport them, and to reſt the hand upon, when the cuſhion is applied to the cylinder in order to charge the machine. The wheel is to be hung with a ſhaft paſſed through its centre, ſo that its rim will fall below the croſs-piece, juſt mentioned, about four inches. The two ends of the ſhaft may be ſupported on the ſides of the upright poſts, by cutting a half circle in the poſts, and by cutting two half circles into two ſmall clefts, and bringing them on over the other half circles cut into the poſts: the two half circles making the whole circle of the ſhaft, they may be put on with nails or wood-ſcrews. One end of the ſhaft muſt be left longer, and extended four inches clear of the outſide of the poſt, on that ſide on which you ſtand to turn the wheel, and a crank be put on this end to turn by, in the ſame manner as a grindſtone is turned.

Now there is room, with this height of the poſts, to make a wheel four feet in diameter. You may take your choice as to the circumference of the wheel; only this you may know, that the larger the wheel is, the eaſier will the machine charge: it ought not to be leſs than three feet diameter, to form a ſtrongly-operating machine, for all ſeaſons of the year.

The wheel may be made of boards, in a ſolid form, of half an inch thick each, and nailed, or put together with ſcrews, the grain of one croſſing the grain of the other, to prevent the wheel from warping, &c. and a place cut for the band: or the wheel may be formed by two arms, croſſed at right angles, and halved together in the centre, leaving them ſufficiently large to ſupport the wheel on the ſhaft, and the rim formed of four felloes, brought on the ends of the arms, &c. and a place cut for the band. The wheel muſt be hung nigh the inſide of one of the poſts, directly under the whirl which is put upon the decanter, called a globe or cylinder.

In chooſing a decanter to make a cylinder or globe of, obſerve that it is blown with a ſmooth ſurface, and round; beſt that the bilge be blown in an oval, or the form of an egg. The late-blown decanters are of a gradual contraction

of diameter, from the bottom to the top, or nearly ſo, and are not ſo convenient. Obſerve that the neck ſtands on a right line with the bilge; and, for the above conſtruction of wood-works, the height of the decanter muſt be about nine inches.

To prepare the decanter for running—firſt, for the bottom, ſcribe a piece of wood, cherry, birch, maple, or mahogany, as you pleaſe, about one quarter of an inch larger than the bottom of the decanter; within that circle, ſcribe the circumference of the bottom of the glaſs, and ſink the glaſs into that nearly half an inch; this is to be ſtuck to the glaſs by a cement. But, before that is done, a box of braſs or iron muſt be had (a blackſmith can make them of iron) about an inch, or an inch and a half ſquare, and a little more than a quarter of an inch thick, with the corners flatted down thin, and holes drilled or punched in them for ſcrews to paſs through into the wood: In the centre of this box a hole muſt be drilled or punched, to receive the points of the large ſcrews, which are paſſed through the upright poſts before deſcribed. This box muſt be ſunk a little into the outſide of that wood, prepared for the bottom of the glaſs; that wood being about an inch and a quarter thick, or an inch may be thick enough. Theſe things being prepared for the bottom of the glaſs, then proceed to prepare the wood for the neck of the decanter. The length of this wood muſt be meaſured from the part where the ſwell of the neck is about three inches in diameter, to one inch clear of the extremity of the neck of the decanter. The diameter of this wood at one end, viz. the end that embraces the ſwell of the glaſs, muſt be a little more than three inches; the other end may be two and a half inches: this may be turned in a lathe, nearly to the form of the glaſs, and it will make it lighter and better for uſe. But a hole is to be bored into this wood, from the largeſt end, to inſert the neck of the decanter: it may be firſt bored with an auger, juſt large enough to receive the top of the decanter, and then with a large taper-bit, and worked out with a raſp, or other inſtrument, ſo as to ſink the decanter, that the neck ſhall approach within an inch of the end of the wood. This wood ſhould be turned, or worked off upon the outſide, ſo as to render it thin and light, excepting the part where the whirl is to be turned in the wood; and the other box is to be ſunk into the end, or elſe ſecured by ſcrews without ſinking, and is to be made in the ſame form of the former box, which is prepared for the bottom of the glaſs. The whirl may be turned, or the place for the band, within one inch of the end, and ſhould be ſo turned as to pinch the band, otherwiſe it will render; but it muſt always be croſs-banded. Having the boxes, ſcrews, woods, all prepared, ſcrew on the boxes, ſo that the ſockets for the points of the large ſcrews may ſtrike the centre

of the glaſs: Then prepare a cement to ſtick the two woods faſt to the glaſs. You may uſe bees-wax, or roſin ſoftened by a little tallow, or boil tar, without burning it, to ſuch a conſiſtency, that, when cold, it will be brittle. Heat the glaſs, as warm as can be held by hand, and likewiſe both the woods; let the cement be warmed till it is quite thin; daub ſome of the cement all round the bottom of the glaſs, kept warm by a fire; then pour ſome hot cement into the place cut out, to ſink the bottom of the decanter into; and immediately ſettle the bottom of the decanter into its place, while the cement is all warm and yielding. This done, proceed in the ſame manner to ſecure the wood upon the neck of the decanter; and it is ready for uſe: Bring it into its place, between the points of the large ſcrews, and ſcrew up their points into the ſockets; after which, put on a ſtrong woollen band, and this part of the machine is completed.

It would be as cheap to purchaſe a glaſs blown purpoſely for the buſineſs: but, becauſe they cannot always be had, I have deſcribed this manner of preparing decanters; and they anſwer about as good a purpoſe as any other.

Prime Conductor.—Whatever is made uſe of to convey the fire from the cylinder to the other glaſs, called the receiver, may be called a prime conductor. I will now deſcribe a cheap one. Turn a piece of wood (pine will do) three feet long, round and ſmooth, the two ends a little convex; cover it with tin, or, what is of leſs coſt, with tea-led, drawn tight to all parts of the wood, and tacked on with ſmall flat-headed nails; let it be nailed all on one ſide, in a ſtraight line; it muſt be nailed, likewiſe, round the two ends; but the heads of the nails, and every part muſt lie ſmooth; there muſt be no points ſtanding out, as they will throw off the fire, and you cannot raiſe a charge.

This conductor is to be hung under the chamber, or any other floor over head, on a horizontal line with the cylinder; or it may be raiſed higher, in order to hang the conductors: two ſtaples, hooks, or braſs rings, with ſcrews, muſt be driven or ſcrewed into the conductor, nigh each end, and on the ſame ſide. Into theſe ſtaples, hooks, or braſs rings, make the end of a large, long gooſe-quill faſt, by turning the end of the quill round the ring, &c. and faſtening the end back with a ſtrong waxen twine. On the other end of each quill, make faſt any ſmall cord, of ſufficient length and ſtrength to ſupport about twenty or thirty pounds weight. Theſe quills are the beſt of any thing I could ever diſcover, to prevent the effluvia from paſſing off: It will paſs off upon hair, upon ſilk, and, in damp air, it will paſs off upon glaſs; but will never paſs upon a clean gooſe-quill.

The next thing is, to drive another ſtaple, hook or ring, into the under ſide of the conductor, nigh the centre: this is to hang a glaſs to, called the receiver, and will ſoon be deſcribed. The next thing will be, to prepare a large wire, the bigneſs of a pipe-ſtem; one end of which is to be driven into the centre of one end of the prime conductor, and the other end, being firſt flatted with a hammer, and with a three-ſquare file cut into three ſharp points, is to approach within an eighth of an inch of the ſurface of the cylinder, in the centre of the glaſs: the points are to collect the fire from the glaſs, as it is promoted by turning the glaſs, and the cuſhion held to the glaſs at the ſame time. This wire conveys the fire to the prime conductor, and the prime conductor will convey it to the receiver, that is to hang under it. Obſerve, the wire, juſt mentioned, and the ſtaple, &c. in the under ſide of the conductor, muſt both touch the lead, which is the coating of the conductor. The wire may be two or three feet long.

There is nothing more to be done to the conductor, than juſt to bore a hole on the upper ſide of it, as it hangs up, nigh the centre, in which to place the electrometer: This hath been deſcribed, (vide page 27—28) and need not be repeated.

Receiver.—The receiver, or battery-glaſs, is that which contains the ſhock. When it is charged, the inſide is ſaid to be plus-electrified, becauſe it hath more than its natural quantity of elementary fire. The outſide is ſaid to be minus-electrified, becauſe it hath leſs than its natural quantity; for the electrical effluvia is drawn off from the outſide of the receiver, and conveyed to the inſide: by this the equilibrium of atmoſphere is broken, and the effort is to reſtore that equilibrium: This is done by forming a conveyance from the inſide, or plus-electrification, to the outſide, or minus-electrification. When the human body forms any part, or the whole of this conveyance, it receives the ſhock, and the equilibrium is reſtored in the receiver.

That receiver which will be of the leaſt coſt, and will require the leaſt preparation, and will anſwer as good a purpoſe as any other, will be a ſquare caſe bottle; the larger it is, the ſtronger the operation. But in chooſing the glaſs, be careful that there is not the leaſt flaw or fracture in it: there will be ſometimes almoſt imperceptible little fire-cracks in the glaſs, that emit the effluvia, although nothing elſe could poſſibly perſpire through them. The glaſs muſt be ſound, and free from all appearance of fractures. Fill the glaſs with braſs filings, or with the cinders or ſcales from a blackſmith's anvil: let them be waſhed clean, then dried in a kettle ſuddenly over a hot fire, then ſifted and put into the glaſs: cover the outſide of the glaſs with the thinneſt of tea-led, ſuch as comes in the green tea cheſts; let it come up as high as the ſtraight ſides of the bottle: fold four or five thickneſſes of paper, and lay one ſuch on each ſide of the glaſs, upon the lead; then, with a few yards of quality binding, bind all firmly and cloſe to the glaſs, from top to bottom.

The next thing will be, to hang this glaſs under the conductor, in the ſtaple before mentioned: This may be done by a large wire, like unto the former, a hook turned in the upper end, to hook to the conductor, and the other end paſſed into the glaſs, ſo as to touch the filling matter, let it be what it may. But how will you make the glaſs hang by this wire? There are two methods of doing this: one is, to drill holes through the wire; and another is, to turn a ring in the wire, which may be very ſmall; then through the ring or the holes to paſs a ſtrong waxen twine, and make it faſt round the neck of the bottle. This nearly completes the machinery. But two chains are wanting to convey the ſhocks to the patient: One of theſe chains brings the ſhock upon the patient, in any part where it is applied; and the other takes off the ſhocks, at whatever part it is applied.

Theſe chains may be made of common wire, of the ſize of a knitting needle, cut eight inches long, and the ends turned and linked together. The chains ſhould be ſix or eight feet long. One wire on each chain, at the end, muſt not be turned, but brought to a point, that it may run through the clothes of a perſon, or through bedding, if the patient is in bed; for the wires muſt always touch the ſkin. The other end of one chain muſt be made faſt, or connect with the coating of the receiver; and this is the chain that paſſes the ſhock from the patient to the vacuum or minus-electrification, and muſt never lie on the patient higher than the other chain, but generally lower. The other chain muſt have one end of it turned in a ring: this is to touch the prime conductor with, in order to take the ſpark, and bring on the ſhock upon the patient; and it will come upon the patient in that part where the other end of the ſame chain is applied. This muſt be well underſtood, or miſtakes will be made in paſſing the ſhocks—their directions will be wrong, and that will do eſſential damage in many particulars. Notice then, once for all, that the ſame chain that takes the ſpark or ſhock from the prime conductor, brings the ſhock upon the patient at whatever part it touches the patient: For inſtance, we will ſuppoſe that one end of the chain, which takes the ſpark from the machine, is held in the patient's right hand; and one end of the other chain, viz. the chain that connects with the leaden coating on the receiver, is held in the patient's left hand. If the ſhock is paſſed, it will fly from right hand to left, in the ſtraighteſt and nigheſt paſſage that can be found through the breaſt. The chain that brings on the ſhock, I have named plus-conveyance, becauſe it conveys the plus-electrification, in the receiver, to the patient. The other I call evacuant, becauſe it evacuates the plus-electrification, or ſhock, from the patient, at whatever part it is applied.

I hope, by this time, any one will fully underſtand how to direct the ſhock, according to the rules taught throughout the whole of chap. 3d. By means of two chains, and underſtanding their diſtinct offices, you will be able to obſerve all the rules preſcribed for directing the ſhocks. You may paſs the ſhock through the joint of a finger only, by laying the plus-conveyance on the one ſide, and the evacuant on the other; or place the plus-conveyance on the head or neck, and the evacuant on the feet, and the ſhock will fly from the head or neck to the feet.

The electrometer is an artificial meaſurement of the quantity of the charge, in any particular receiver; but the quantity or charge is greater or leſs, according to the bigneſs of the receiver; and the electrometer only exhibits to your view the degree of charge, in any individual receiver. The little cork-balls, in the electrometer, as the machine charges, condenſe round themſelves, globular atmoſpheres; the atmoſpheres increaſe as the machine charges; and as the atmoſpheres increaſe, the balls are ſeparated by their own atmoſpheres. When the machine charges freely, the balls may be propelled to a horizontal plain; and if there is no body intervening, to affect the natural attitude of their atmoſpheres, they cannot be altered by an increaſe of the charge from that horizontal poſition. If any body leſs electrified approaches the globules of the electrometer, it will attract to it; but if higher electrified, it will be propelled by that body.

We have completed our machine for giving the ſhock, excepting a cuſhion, and the malgam to be put upon the cuſhion, in order to excite the friction upon the glaſs we call the globe, or cylinder. There are a variety of cuſhions made uſe of: ſome are fixed with a ſcrew, or ſpring, under the glaſs. But I have never uſed any thing but a piece of ſoft calf ſkin, or deer or ſheep ſkin; but the fleſh ſide of calf ſkin, cut out of the flank, is the beſt of any that I could ever find; the malgam will adhere to it: the piece may be four or five inches long, and three broad; the malgam rubbed upon the fleſh ſide. One end of this leather, held with the thumb in the palm of the hand, and preſſed by the ends of the fingers to the glaſs, will collect the fire and charge the machine. It muſt be held to the glaſs directly oppoſite the points of the conductor.

Malgam is made of pewter and quickſilver, or zinc and quickſilver. Melt about one ounce and a half of pewter; when melted, pour it into a heated earthen cup or veſſel; while it is in the melted ſtate, pour into it one ounce of quickſilver; and when this is cool it is fit for uſe. A piece as big as a ſmall pea, is ſufficient to rub on the cuſhion at one time. A ſmall piece of tallow, not to exceed a ſmall pea, may be rubbed on the cylinder, in damp, ſultry weather; and it will cauſe the malgam to adhere to the cuſhion. Sometimes it will charge beſt with the malgam ſide to the glaſs; and at other times, the leather without malgam is beſt: this is ſoon known, by turning the cuſhion end for end, or upſide down. From theſe cauſes, I have never had my cuſhion immoveably fixed to the glaſs, but have held it by hand. But it will be neceſſary to have the cuſhions ſupported to the glaſs by ſprings, in thoſe machines which are carried by water-works; and the cuſhion muſt be of ſeveral yards in length, and, by means of ſome wheels and pullies, to have it draw ſlowly through upon the ſpring; perhaps four yards would be ſufficient to rarify during twelve hours. The machine already deſcribed is the cheapeſt that can be built to anſwer medical purpoſes. But this conſtruction may be rendered ornamental. The prime conductor, inſtead of being covered with lead, may be gilt with gold, ſilver, or braſs leaf: the outſide of the receiver may be gilt; and, if it were an open glaſs, the inſide might be gilded. The wood-works may all be made of mahogany, and elegantly wrought; or of pine, and beautifully painted, &c.

There is another method of conſtructing the frame, which, on ſome accounts, will be more convenient, and the coſt very little, if any more than the other; and it will hang the conductor, receiver and all in the ſame frame. This will make it more handy to move from place to place, to a bed-ſide or to the fire-ſide, as will be neceſſary in damp weather, to dry the glaſſes; and to carry to a neighbour's houſe, if neceſſary, &c.

To do this, let the feet or ſills, before mentioned, be cut four, or four and a half feet long, and the two poſts that ſupport the wheel, &c. be framed quite to one end; and let two pair more be made, of an inch board, and three or four inches wide; one pair muſt be framed in quite to the oppoſite end of the ſame ſills; then obſerve the diſtance of the two ſtaples or rings in the conductor, by which it is hung, and make that diſtance the diſtance of the two laſt poſts, or upright ſtrips of boards; then let theſe two additional poſts be croſſed at the top with ſtrips of boards; then to theſe croſs-pieces hang the conductor. Theſe laſt poſts may be again croſſed by two other pieces, as low as the bottom of the receiver, and a board, laid upon theſe croſs-pieces, will ſerve to reſt the receiver upon: this will be more ſafe than to ſuſpend ſo great a weight upon the conductor. The electrometer may ſtill be ſtepped in the centre of the prime conductor, on the top, as before directed.

The top of the receiver, or the uncoated part of the glaſs, muſt always be kept very clean and entirely dry: in damp weather, it muſt be rubbed dry with cloths, or be dried by a fire: a hand that is ſweaty or greaſy, muſt not touch that part of the glaſs, neither muſt a perſon breathe upon it; that dampneſs upon the glaſs

would form a conveyance from the inſide to the outſide of the glaſs, and the machine could not charge—the equilibrium of atmoſphere could not be broken. In bad ſtates of air, it is deterimental for people to ſtand round the receiver, or for many to be in the ſame room: their breath creates a dampneſs, that impedes the charging of the machine. If the wind is not very dry, it has the ſame effect.

The receiver may be charged, and the ſhocks given, (though not accurately) without all this parade of a large conductor, &c. Thus, take the large wire, that extended from the prime conductor to the cylinder, and, having a cork that will fit the bottles, run the wire through the cork, ſo as to touch the ſubſtance with which the glaſs is filled; then, holding the receiver in your hands, bring the pointed end to the cylinder, as nigh as before directed; and the cylinder, being turned, will charge the receiver as highly as by any other means. But you cannot know the degree of the charge, and it would be dangerous to electrify weak perſons in this manner. In dry weather, this receiver may be carried a great diſtance, and the ſhock given from it: In this caſe, a perſon may take the ſhock by laying one hand on the coating of the receiver, and touching the other to the wire that goes into the receiver: his body will form the whole conveyance, from the plus to the minus electrification; or he may uſe both chains, as in the other form of charging.

N. B. A machine ſhould be kept in a dry room, where there is a fire, that it may always be ready for uſe. When a malgam cannot handily be had, chalk may be ſcraped on the cuſhion, and that will charge the machine.

Inſolating Stools.—Take a board, ſufficiently wide and long for a perſon to ſit upon in a chair; and acroſs the ends of this board muſt be nailed two other pieces of board, as long as the other is wide; and the width of theſe muſt be ſufficient to let through the bottom of porter or wine bottles; one bottle through each end will ſtand under each corner of the wide board, which will form the ſtool, or ſtand, upon four glaſs legs, at each corner: theſe bottles muſt be ſet in with a ſtrong cement, like that uſed upon the cylinder; when this is done, the ſtool will reſt upon the necks of the bottles, to the floor: theſe bottles ſhould be of an equal height, and muſt always be kept clean and dry. The wood muſt be rounded on the edges and corners; no ſharp points, ſplinters, heads or points of nails, muſt be ſuffered to ſtand out of the wood; the ſurface muſt be ſmooth in all parts; any roughneſs, points, &c. will diſſipate the fire, or effluvia, and ſo prevent the inſolation, at leaſt in a degree.

A perſon, ſtanding or ſitting on this ſtand, may communicate with the prime conductor, by laying on a hand, or elſe by holding a large wire by one end, and reſting the other on the conductor. The ends of this wire ſhould be covered with bees-wax; or, if the wire is large, and rounded ſmoothly, it may do well enough. The perſon in this ſituation, and the machine being charged, will be on an equilibrium of atmoſphere with the prime conductor. If the perſon is touched by the finger of a ſpectator, a ſpark of fire will be very viſible, in a dark room.

Many entertaining exhibitions may be performed on the ſtand, and by many other parts and powers of the electrical bodies, in different parts of the machinery; ſuch as wheels running—balls ſwinging—figures of the human ſpecies, cut out of gilt paper, dancing—imitation of ſnow or rain, ſtorms, &c. and many other ſtrange appearances, too numerous to mention: and, as real uſefulneſs, and not amuſement, is the object of theſe pages, I ſhall paſs the moſt of them unnoticed.

The uſe of theſe glaſs legs are, to prevent the effluvia from paſſing off to the floor: accordingly, holes may be bored in the bottom of the bed-poſts, and the necks of the bottles inſerted, one in each poſt, ſo as to cut off communication with the floor; and a perſon may be inſolated in bed, by means of a metallic rod, to communicate with the prime conductor.

I have deſcribed the aural tube, or rod, (vide page 191—192.)

Natural imitation of Lightning.

DRILL a hole through a quart decanter, as large as will receive a ſmall wire; put into the decanter a little of the white of an egg, juſt enough to daub over the bottom of the decanter; for you cannot turn any back without its falling upon the ſides of the glaſs, and that muſt be avoided: then throw in of the filings of braſs, or fine cinders, prepared as before directed, as many as will cover the bottom of the decanter; then let it ſtand till it is quite dry; then ſhake out the looſe particles; then put a wire into the bottom, and, by a ſtick put into the decanter, turn the end of the wire ſhort down, to prevent its drawing out; then cut gold or ſilver leaf into very ſmall particles, ſo many as will fill a table ſpoon; put them into the decanter; let a large wire be paſſed through a cork that will ſtop the decanter, and a leaden, pewter or braſs ball, as large as will enter the decanter, muſt be put upon the end of the wire, and put into the decanter, and let down within four or five inches of the bottom: the wire muſt be made faſt at the neck of the decanter, by the ſame means that were directed for the receiver, (vide p. 250:) A hook muſt alſo be turned in the end of the wire, that it may be hung under the conductor, which will require another ring, or ſtaple, (for the receiver muſt not be taken off.) When all this is ready, let the chain that I call the evacuant, be connected with the wire that is in the bottom of the decanter: then there is a metallic conveyance formed from the plus to the minus electrification, on the receiver, excepting four or five inches, which is the diſtance between the bottom of the decanter and the ball that hangs in it. The intention now is, to make the whole charge leap from the ball to the bottom of the decanter; and I ſuppoſe the fire may be made to leap much farther, but I have never tried it.

The particles of gold leaf, I have ſubſtituted for particles of rain, falling from the thunder-cloud, &c. As ſoon as the machine charges, an atmoſphere will be formed round the ball in the glaſs: this atmoſphere will attract the particles of leaf, and they will ſtrike the ball; by which means, each particle receives an atmoſphere of its own, and is inſtantly repelled by the ſuperior atmoſphere of the ball, and ſtrikes the bottom of the decanter, where it loſes its atmoſphere on the metallic ſubſtance, prepared for the purpoſe; hence it is inſtantly ſubjected to the laws of attraction, and ſtrikes the ball again, &c. Thus theſe thouſands of particles fly, in quick ſucceſſion, from the plus to the minus electrification, until they chance to come in ſuch cloſe contact that they form a conveyance, and the whole charge leaps or breaks down upon them to the bottom of the decanter, and is by the wires conveyed into the vacuum, or outſide of the receiver. In good weather, with a large receiver, there will be a ſtriking imitation of the fire from the cloud; there is the ſame divergency and zig-zag appearances: it is lightning, to a demonſtration; but, in order to render it conſpicuous, it ſhould be performed in the dark.

It is the aſcending particles which form the conveyance chiefly, becauſe the deſcending are propelled from each other by their atmoſpheres; many of them will fall on the ſides of the glaſs, forming partial conveyances; this will often cauſe the ſpark to ſhoot round about in the glaſs, in the ſame natural manner in which it is ſeen in the cloud, when it hath not a ſufficient conductor to bring it to the ground. The ball in the decanter anſwers to the ſtate of the thunder-cloud; the bottom is the ſtate of the earth, and the particles of leaf are a ſubſtitute for the falling rain, &c.

Method of extracting Lightning, &c.

Lest ſome ſhould ſuppoſe, that the ſhocks from the artificial machine are not, in their nature and effect, the ſame as thoſe which deſcend from the clouds, I will ſtate the method of putting it to actual experiment, as it hath often been done; and if it proves true that the action of lightning from a cloud is the ſame, in nature and effect, on the human body, then no uncertainty remains of the truth of my leading principles, on the ſubject of medical electricity.

Make a ſmall croſs, of two thin, light ſtrips of wood; the arms muſt be juſt long enough to reach the four corners of a large thin ſilk handkerchief, when extended; tie the four corners of the handkerchief to the extremities of the arms of the croſs, and this forms the body of a kite; to this add the loop, tail and ſtring, and it will riſe in the air, as freely as one made of paper: But this will bear the wind and wet, in a ſtorm, much better than paper. To the top of the croſs, ſet in a ſharp-pointed wire, riſing about eighteen inches above it: tie in a large key to the end of the twine that holds the kite; and to the other end of the key make faſt the ſmall end of a gooſe-quill, and by the other end of the quill the kite is to be held. This quill will prevent the fire from running below the key, if the quill is kept dry; and in order for this, the perſon that holds the kite muſt ſtand in a porch, or under ſome other covering, that the quill may not be wet. Neither muſt the twine, or ſtring by which the kite is held, touch any part of a building, tree, or any thing elſe. As ſoon as the thunder-cloud comes over the kite, the pointed wire draws the electric fire from the atmoſphere of the cloud: this atmoſphere of the cloud is attracted towards the earth, becauſe the earth is leſs electrified than the cloud. The atmoſphere of the cloud points or tails toward the minus-electrification in the earth, in the ſame manner as the ſuperior atmoſphere, or plus-electrification in the ſun, propels the atmoſphere of a comet into a tail or ſtream of extreme denſity, behind the comet, oppoſite the ſun; whereby its denſity, not rarefaction, (as Sir Iſaac Newton ſuppoſes, becauſe it is ſecluded from the ſun's light) appears luminous, very much like the aurora-borealis, which we know is not rarefaction.

By the atmoſphere of the cloud's being attracted towards the earth, the kite is ſoon enveloped in higher electrification, and conducts it towards the earth. As ſoon as the twine becomes wet, ſo as to conduct the fire more freely, it will ſtream from the key, on the approach of a finger.

N. B. It is well to wet the twine before the kite is ſent up.

If you hold a receiver to the key, prepared as directed, (vide page 251 and 252) it will be charged in the ſame manner, and produce the ſame kind of a ſhock, as it would if held to the cylinder, and the fire collected by the artificial machinery; and if you ſtand upon an inſolating ſtool, and hold one hand on the key, you will be filled with fire, in the ſame manner as you would be by holding a hand on the prime conductor of an artificial machine.

Every effect produced, and every appearance, proves that the fire extracted from the thunder-cloud is the ſame in its properties and effects as that which is promoted and collected by the artificial machinery. It conſequently eſtabliſhes the truth of my hypotheſis, drawn from the over-action of the ſhock received from the thunder-cloud, concerning which it was contended, that if the exceſſive, or over-action of the electrical effluvia would ſo ſwell, dilate, diſtend or expand the veſſels, as to take off all tone, tenſion or action on the whole vaſcular ſyſtem at a touch, thereby cauſing an inſtantaneous ceſſation of pulſation, and not only ſo, but alſo to rupture or burſt the veſſels, that a due degree might be found, and indeed is found, that will take off that over-action ariſing from an increaſed degree of tenſion, or diminution of the diameters of the veſſels, which attends or conſtitutes fever, peripneumony, and all the like caſes of increaſed morbid action. Alſo, as the over-action of the ſhock was conſpicuous in dilating and expanding the pores in the ſkin, (vide chap. 2d, page 72 and 73;) where it is clearly demonſtrated, that in the artificial and proper uſe of this element, we have found an infallible cure of fever and inflammation; and by its expanding the veſſels, fermenting and attenuating the fluids univerſally, it promotes every deſcription of ſecretions, clears every obſtructed veſſel, ſeparates every coagulated particle, induceth an eaſy, uninterrupted equilibrium of circulations; and, conſidering the direct ſtimulus of the ſupernatural inſolation, its power of invigorating the circulations, and animating all the animal functions, being the criterion of life itſelf in the ſtate of nature, we may with the utmoſt propriety conclude, even without an experiment, that nine-tenths of all neceſſary medicine is compriſed in a judicious and prudent uſe of this ethereal fire; eſpecially if we conſider its power of preventing ſome particular diſaſters, which, when arrived and ſeated, it cannot remove, ſuch as the ſtone, univerſal palſy, and a few other diſeaſes, in ſome of which it can do no good, and but little in ſome others, but which may almoſt, if not always, be prevented by a prudent, frequent and timely uſe of the electrical effluvia.

But if, after all the arguments made uſe of in the ſubſequent pages, a doubt ſhould remain of the truth of my pretenſions, let the experiment be made, without any variations from the preſcribed rules, carefully avoiding coolneſs and the over-action of the ſhock, and all doubting will ſoon vaniſh, and leave me maſter of the field of conteſt, with thouſands who have ignorantly and wickedly oppoſed the progreſs of an art, in the completion of which the lives and healths of mankind are deeply concerned.

The uſe of Lightning-Rods.

THESE rods, invented by Dr. Franklin, are a great ſafety, not only to buildings, to prevent them from being ſet on fire, or blown and ſhivered to pieces: but, what is of greater

importance, they are a ſafety to the lives of people, in a building where the rod is properly placed. This ſafety doth not conſiſt only in the points attracting the effluvia that approaches nigh to the houſe unto the rod; but alſo in the quality of the rod to conduct this expanded element clear of the building, being the moſt ſuitable and apt conductor known, and from which it cannot be eaſily diverted by any other bodies, although in the cloſeſt contact with it, eſpecially ſuch as generally compoſe buildings: and, if a human body was in contact even with the rod, it could not divert a ſufficient quantity from the rod into itſelf to take away life, unleſs the body of fire was conſiderably large, (vide chap. 2d, page 70 and 71.) A perſon may extend his hands upon a wire, and a ſtrong ſhock may be paſſed upon the wire, through his hands, and there will not be the leaſt perceptible degree diverted from the wire into that body. But, inaſmuch as the human body is an apt conductor, though inferior to metallic ſubſtances, a ſhock may be raiſed ſo high that a part, in this circumſtance, would be taken into the human body from the wire.

A building that is lengthy, ſhould have a rod at each end of the houſe; or if there is but one funnel carried out, and that nearly in the centre of the houſe, the rod ſhould be extended eighteen or twenty feet, at leaſt, above the chimney, that the attraction of the points may be the ſooner felt by the approaching lightning; leſt, by ſome oblique direction of the body of fire, it ſhould eſcape the points and fall upon the houſe.

But a better method to ſecure a large building, would be to raiſe one rod in the centre, as before deſcribed, and to weld on two arms a little above the ridge, extending their points to the two extremes of the building: ſuch a poſition of the points would undoubtedly catch the falling lightning, in whatever direction it might approach a building. The lower end of the rod ſhould be ſunk ſix or eight feet into the earth, and a buſhel or two of charcoal placed round the bottom of the rod; the coal will ſeparate the body of fire into thouſands of ſmall particles, by which means it will be the more readily abſorbed in the earth, and prevent its ploughing up the ground.

Cautions in time of Lightning.

As it is undoubtedly true that lightning, or the electric ſhock, inclines to ſome conductors, in preference to others which are leſs apt or ſuitable; and as the human body is a more apt or ſuitable conductor of this effluvia, than the materials which commonly compoſe a building, whether they be wood, brick, ſtone, &c. it is not difficult to infer the danger that the human body is expoſed to, by touching the ſides of a building, at the inſtant a body of lightning falls upon it. The inſtant the electric body touches a building, that whole building is plus-electrified, and the body of fire inſtantaneouſly feels its beſt paſſage through the building. An electrician might eaſily account for all its windings and various directions through the houſe; and it will make uſe of every the leaſt preferable conductor that is in contact with any perpendicular part of the building, although they may be ſometimes in a horizontal poſition. From theſe principles it is, that people are always ſlain who are found in contact with the upright parts of a building, deſtitute of rods, when ſtruck by lightning; while others, in the ſame building, will often eſcape unhurt. It is not often known, that people in the middle of a large room are ſlain by the ſhock, although they may be ſtunned: and when it ſo happens that they are ſlain in ſuch a part of the building, it is commonly in conſequence of the ſhock being conducted by ſome apt conveyance, and diſcharged from its extremity into a direction with the perſon in the room: ſuch may be fire-arms, ſwords, &c. The lock of a muſket would undoubtedly diſcharge it upon the head of a perſon ſitting or ſtanding under it. Such metallic inſtruments ought to be kept out of a dwelling-room, or hung perpendicularly down the ſides of a room, with the lower extremities nigh the floor. It is more ſafe to ſit low in a room, than to let the head approach nigh the flooring over head, leſt the head attract the ſhock from the materials above, to itſelf, being a better conductor. In chooſing the ſafeſt place in a room, let the greateſt diſtance from any of the ſides, be that of a fire-place, eſpecially if there is a body of ſmoke aſcending: The ſmoke, as I have experienced, will conduct the effluvia; hence the lightning moſt commonly comes down the chimney: wherefore take the greateſt diſtance from a fire-place. When there is lightning in the night, draw your bed two or three feet from the ſides of the room, leſt the fire ſtrike off the ſide into the bed, and kill you.

People in the fields are apt to take ſhelter under a tree, in time of a thunder-ſhower; but this is highly imprudent; and ſometimes mowers will hang their ſcythes over their heads, on the ſame tree. In this circumſtance, people have been found dead, lying in a direction with the points of their ſcythes, from which the ſhock was emitted into their heads. Perhaps they might have eſcaped, had they placed themſelves in a contrary poſition with their ſcythes. Moreover there is danger from the ſplinters, if the lightning is conducted deeply into the tree, which is often the caſe, eſpecially in pines: the ſap of a pine is a non-conductor; and hence pine trees more frequently receive the lightning into their hearts, and conſequently are blown aſunder from top to bottom.

From all theſe obſervations, it appears to be every one's duty to keep at a diſtance from trees in time of lightning, and uſe all prudent means, ſince we now know the nature of this element, to eſcape dangers by it; which is as much our duty, as to provide againſt wind, rain, or danger from any other diſaſtrous contingency in nature; neither can it imply any diſtruſt of Divine Providence.

Some further Directions for uſing Electricity.

As electrifying, in a proper manner, is not only a reſtorative of health when it is loſt, in an extraordinary degree; but alſo an extenſive preventative of diſeaſes in general, (even when they become epidemic and very mortal, under particular circumſtances) in thoſe who uſe it in a manner favourable to its true principles; or if diſeaſe ſhould appear in a perſon who hath been under a prudent uſe of electricity as a preventative of diſeaſe, which I have never known to happen, it muſt be mild, and eaſily flung off. As to fever, it is impoſſible, in the nature of things, that it ſhould commence in any perſon that ſhall uſe this truly anti-febrile ſpecific in manner and degree which is now to be preſcribed.

In pointing out the proper manner of uſing the electrical ſhocks, as a preventative of diſeaſe, fever in particular, my attention will be principally turned towards thoſe ſuffering people in the metropolis of ſeveral of our ſea-ports in the United States, and may be equally ſerviceable to any others in the like circumſtances; and not only ſo, but may afford ſufficient information on the mode of treatment in diſſimilar circumſtances, varying according to the nature of the prevailing diſeaſe.

The fever which hath, for ſome years paſt, threatened to depopulate New-York, Philadelphia, &c. and may poſſibly attack them again, in its progreſs hurries on to ſudden death. It may not always be ſafe, even with electricity at hand, to ſuffer an attack of the fever, in ſome habits, without, at leaſt, preparing the ſyſtem to receive it mildly: In order for which, I will preſcribe the beſt methods in my power. Let perſons of a firm, robuſt habit, electrify once in a day, eſpecially if the diſeaſe is very prevalent; the number of ſhocks muſt be diſcretionary, obſerving to take ſo many as will be ſufficient to promote perſpiration freely, with a trifle of exerciſe. Sometimes it will be ſufficient to electrify once in two or three days, as people are differently affected by the ſhocks; but ſo many of the ſhocks muſt be taken as will keep the fluids ſufficiently attenuated, the ſecretions in free action, the perſpiration voluntary and eaſy. Theſe operations being made in the ſyſtem, it will be impoſſible for any morbid, increaſed action to ariſe in the ſyſtem: the cauſes of morbid heat are intirely cut off; and it is impoſſible, in the nature of things, for fever to ariſe. And, even if fever has, in any degree,

its riſe from the craſamentum of the blood, as ſome ſuppoſe, electrifying will reduce the craſamentum, as I have often obſerved when I have uſed it frequently on the ſame perſon, eſpecially if perſpiration is kept up. If any will drink ardent ſpirits, it will be neceſſary for ſuch to uſe the ſhock more frequently than thoſe who make little or no uſe of them. The number of ſhocks neceſſary for a robuſt perſon to take daily, may be from ſix to twelve; ſome of which, being the laſt on each time of electrifying, ſhould be paſſed from the ſides of the neck to the feet. Foulneſs of the ſtomach, and coſtiveneſs, muſt be carefully avoided by their proper remedies. If, by any means, as by ſudden cold, ſymptoms of fever ſhould appear, then the whole proceſs by electricity, as directed for fever, muſt be immediately reſorted to: the whole ſafety by electricity, is ſuſpended on the immediate application of it to the patient.

People of delicate habits will be equally ſecured againſt fever by an application reduced to the degree of their diminiſhed ſtrength: they may obſerve the ſame decorum; that is, to electrify juſt ſo much, and ſo frequently as will ſubject them to an eaſy, voluntary perſpiration, but not profuſe.

The only thing to be regretted in the uſe of the electric ſhock, is, that the ſubject of it is neceſſarily ſubjected to a ſtrict attention to a ſteady degree of warmth: this muſt be attended to, or a ſudden cold will, in all probability, induce that ſame diſeaſe which you are endeavouring to avoid. People who labour, ſhould provide themſelves with warm clothing, to be put on as ſoon as they deſiſt labour; and watch all opportunities of danger from every quarter.

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THOUGHTS ON THE TIMES.

IF we may believe the ſacred hiſtorians, as well as ſome others whoſe accounts corroborate the former in many inſtances, mankind have experienced certain events which have diſtinguiſhed their eras with very ſignal importance: And, it is further obſervable, that about the epoch of theſe events, there has been a general alarm given to mankind of their approach. We will go no farther back, than to the incarnation of the Meſſiah: It is evident from the ſcriptures, and from other writings, that there was a general alarm given to the Jews of his approach; the whole Jewiſh nation were expecting of him at the very time he came. Biſhop Andrews mentions nine counterfeit Meſſiahs, who ſprung up about the ſame time; undoubtedly at the inſtigation of Satan, to elude the true one.

If we may believe Joſephus, the deſtruction of the Jewiſh nation was announced from heaven, by omens aſtoniſhing to man; and, according to St. Luke, our Lord marked the time of his ſecond coming by ſimilar omens, and intimated that the effect of them upon mankind in general would be much the ſame: for as the Jews either paſſed them unnoticed, or miſconſtrued them, ſo it is at this day. If I miſtake not, an event big with fate is juſt before us, but unnoticed, even by thoſe who are employed as inſtruments to introduce the important ſcenery; I mean thoſe whom Heaven employs to eſtabliſh to man his unalienable rights, civil and religious, called, in the Revelations, the two Witneſſes: This is a neceſſary prelude to the diſplay of his grace, in the Millennium.—If the general expectation of the Meſſiah, by the Jews, is an evidence that he did come at that time, which may be admitted; then it follows, that the univerſal expectation of his ſecond coming, by all under the goſpel, who keep their eyes upon the ſacred index, and compare it with the preſent appearances, in church and ſtate, in the natural and ſpiritual worlds, is an evidence that the era draws near: On the other hand, the general prevalency of infidelity, of darkneſs and obſcurity, that ſo pervades the minds of the greater part of mankind, that they cannot diſcern any colouring of evidence that the ſcriptures are of divine original. The man of ſin, who hath juſt now furniſhed this fund of infidelity; the great abilities of his inſtruments, Paines, Volneys, &c. all fix this day, and determine it to be under the theme of prophecy. The powers of heaven are ſhaken, and the ſtars are falling to the earth;* that is, the power of the Chriſtian faith is ſhaken; and even the preachers of the goſpel, called ſtars, are declining the faith in Chriſt, and are turning to the beggarly elements, the world. This day is like the cloud that ſtood between the armies of Iſrael and the Egyptian hoſt: it gives light to them who deſire light, but darkneſs to the others. So we read in the Revelations, "*The angel poured out his vial upon the ſeat of the beaſt, and his kingdom was filled with darkneſs; and they gnawed their tongues for pain, and blaſphemed the God of heaven.*" We have ſeen the vial executed upon the ſeat of the beaſt, in part at leaſt: the papal power, and his kingdom, is aſtoniſhingly filled with darkneſs; the whole French nation are ſunk into a diſbelief of the ſacred writings. But the ſeat of the beaſt may extend to all who are not born of God: for this darkneſs is almoſt inſtantaneous throughout the Chriſtian world. "*And they gnawed their tongues for pain.*" This may be underſtood of that gloomineſs of mind, which it is impoſſible for a man to avoid, who falls from that exalted expectation of the reſurrection from the dead, and the hope of immortal life, into the miſerable uncertainty even of any exiſtence at all beyond the preſent ſtate: and, certainly, if they deny the Lord that bought them, and call him a hypocrite, an impoſtor, and, if I may dare to write it, a baſtard, no one will doubt that they blaſpheme the God of heaven. I write not this to upbraid any man; but, if any of my readers ſhould be overcome and darkened by this judicial flood, which hath ſpread itſelf throughout the Chriſtian world, I muſt beſeech him to be careful of himſelf, to be careful of the ſeduction of the times, and finally, to be careful that he doth not blaſpheme God in the perſon of the holy Galilean, leſt God ſhould reſent it, to his own incalculable loſs.

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* Mr. Pope might have ſpared himſelf the taſk of combating this paſſage, from the lips of a divine teacher: (vide *Pope's Eſſay on Man.)*

"Let ruling angels from their ſpheres be hurl'd,
"Being on being wreck'd, and world on world;
"Heav'n's whole foundations to their centre nod,
"And nature tremble to the throne of God.
"All this dread order break! for whom? for thee?
"Vile wretch! O madneſs, pride, impiety."

It is certain that our Lord is not literally to be underſtood in this paſſage: But we know, that by heaven we underſtand the church millitant, and by ſtars, the teachers of the word.

Again, we read, “*The ſpirit of life from God pervaded the dead bodies in the ſtreets of the great city Babylon; and they aroſe, and ſtood upon their feet, an exceeding great army, about twenty-ſix millions*,” as we are now able to number that army of Frenchmen, called the two witneſſes, or witneſſes to two things, viz. the civil and religious rights of man. This hath been done before our eyes—the prophecy amply fulfilled; but who heeds it? A few, as I ſaid before, who keep their eyes upon the ſacred index, that points to them and us to obſerve them, if we will. But obſerve, this ſpirit of life, &c. does not imply ſanctifying grace, but only a reſolute civil compact, by which they, viz. the French nation, reſolved, almoſt as one man, to break the bands of civil and religious tyranny, and aſſume their unalienable rights. To this Heaven bore them witneſs, and gave them ample ſucceſs againſt their enemies, who are inſatiably voracious for the uſurpation of all rights. And, notwithſtanding the preſent ceſſation of hoſtilities, there is no doubt but that there is more to be done by theſe two witneſſes; they muſt proceed to the utter overthrow of this uſurpation, and eſtabliſh the broad baſis of civil and religious liberty among the nations. Heaven may not make uſe of the ſame inſtruments; but the ſpirit will be one, and the ſucceſs of it one, till an effectual door is opened for the diſplay of goſpel grace with great power. The oppoſition to this reform, Heaven will puniſh, in various forms, till it is brought to ſilence: Hence it is prudent, not only for nations, but for individuals, to take heed that they are not found even to fight againſt God: I muſt own, that I have always thought that the beſom of deſtruction, which has ſwept away, in ſo dreadful a manner, thouſands of people from ſeveral of our metropolis cities, during our ſhameful contempt and ungrateful neglect of a ſiſter republic, was nothing leſs than the finger of God pointed againſt us. And that Preſident Adams made a great miſtake, when he ſaid, “the finger of God was pointed againſt France.” It is more likely to me, that had not we pointed ſo many fingers againſt the two witneſſes, the finger of God would not have been ſo eminently pointed againſt us. Beſides, we had juſt been liberated from the ſame accurſt ſpirit of uſurpation, and not without the interpoſition of Heaven, who alſo made us friends of that very nation which he was juſt about to liberate, and ſent them, as it were, to light their torch at our flame. But the American gold became dim, as though it was cankered by the ruſt of the Britiſh court: we could look calmly on, and ſee our ſiſter republic, as we pretended to call them, ſtruggling through ſeas of blood, oppreſſed on every hand; and we ſported with their calamity; we joined affinity with their bloody enemies; we baniſhed them from our coaſt; at the nod of a Britiſh ſycophant, we curſed them: Our nation piled all the calumnies upon them; yea, vied with Britain, which ſhould ſtamp the moſt indelible ſtain upon them. And for what was all this done? What old tory can hold up his head, and not bluſh to anſwer to this charge of ingratitude on America—this cowardly deed, for which Mr. Adams plead, when he ſaid, "the fate of France was ſuſpended upon a thread!" Methinks that thread almighty cannot be broken. The truth is, our government ſaw not the nature of the conteſt—that theſe times came under the theme of prophecy: But that was not all; we had too many old tories in office; and we became corrupted, till Heaven made war upon the ſeats of this pollution. Indeeed, I am ſo ſanguine in the belief of this, that I heſitated not to tell ſome gentlemen, at Catſkill, in the ſpring of the year 1801, that I doubted not that

the revolution taking place in our government, would ſtop this peſtilential war that Heaven was making upon us: ſo far it appears to be verified; and I am ſo confident that this was a judicial ſcourge, that I will venture, in this public manner, to give it as my opinion, that this ſcourge will be ſtayed, in proportion as we give the friendly hand to the two witneſſes.

But, it may be objected, we have been leſs guilty than others, who have drawn the ſword, and made war upon them, and ſeem to eſcape with impunity. To which I anſwer: The murderers of Stephen, or of his Divine Maſter, appear to have eſcaped with impunity; while Ananias and his wife, for a ſeemingly leſs crime, were ſtruck dead. Let me obſerve, the great drama, which ultimately will revolutionize all nations, was firſt opened in America, and was accompanied with ſeveral phenomena in the heavens, which diſtinguiſhed it from all wars ſince the deſtruction of the Jewiſh nation. The firſt ſtep in the kingdom of Providence, was taken in America, to introduce the reign of peace conſiſtently with enlightened minds, and to pave the way for the reign of his grace; an earneſt of which, and a ſpecimen, was given on the day of pentecoſt. This being the peculiar ſituation of America, or our part of it at leaſt, and Heaven being determined to accompliſh the work firſt, where it was firſt begun, the line is drawn upon us, and we muſt ſubmit to the ſtraightneſs of it, or ſuffer the conſequences of reſiſting the immediate agency of Heaven among the nations. Hence, I am not aſhamed to ſay, it is not without the ſuperintendance of Providence, that men, who are, in their hearts, unfriendly to the eſtabliſhment of the equal rights of man, are put down from office, in the United States—"the finger of God is pointed againſt them." No matter who is the inſtrument, God is the cauſe.

Think not that I am electioneering for a party; in that reſpect, I have no intereſt to prompt me to write a ſyllable, neither have I any motive for ſo doing, but only to ſhew that the times demand that we keep an eye upon the prophecies—that we follow the cloudy pillar—that, in giving our ſuffrages, we be careful to examine the character of the candidate: Is he favourable to the two witneſſes? Are the rights of man ſacred to him? &c. &c. If I could be heard to the ſeat of government, I would addreſs myſelf to our greatly-beloved Jefferſon: Hail Patriot! favoured of Heaven! go on to co-operate with the Prince of Peace: fear not thy oppoſers—"the finger of God is pointed againſt them"—it dethroned thy predeceſſor—it will put them all to ſhame. This is the day, long looked for, in which politics involve prophecies, and prophecies politics: The eye of Heaven is now fixed upon politicians; if they thwart the purpoſes of their Celeſtial Preſident, "his finger is pointed againſt them."

The preſent times demand a degree of ſeriouſneſs, which, by the way, is much out of faſhion; and no man can act conſiſtently, in political concerns, who doth not view the preſent revolution as a prelude to the millennium, and conduct himſelf, or the concerns intruſted to him, as knowing the great Revolutioniſt takes a minute cognizance of him.

To be brief, the true politician ſuſtains a dignified character at the preſent day. To ſuch I addreſs my cloſing lines: Keep your eyes upon the end that Heaven hath in view; lend all your aid to eſtabliſh freedom and equality among mankind—to ſuppreſs the intrigues of the abettors of tyranny and uſurpation; ſet your faces as a flint againſt them, nor be partakers of their crimes: Feel the dignity of acting in concert with the King Immortal, expecting, ere long, to ſee the myſtery of God finiſhed; when, by the ſeventh trumpet, every mountain of monarchy, or iſland of uſurpation, ſhall be moved out of its place, and the kingdoms of this world become the kingdom of our Lord, and of his Chriſt.

FINIS.

ERRATA.

Page 19—20, for "imparted," read *impacted.*
Page 22, ſeventh line from top, for "by," read *paſt.*
Page 173, eighth line from bottom, for "iternum," read *ſternum.*
Do. fifth line from bottom, for "turned down," read *turn downward.*
Page 188, add, in the parentheſis, *in ſuch caſes.*
Page 212, ſixteenth line from top, for "and," read *of.*
Page 225, eighteenth line from top, for "ramifactions," read *ramifications.*

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